JOURNAL

OF

The Philadelphia College of Pharmacy.

NEW SERIES.

VOL. I.—APRIL 1829.—NO. I.

PROSPECTUS.

The Philadelphia College of Pharmacy having determined, as soon after its organization as was practicable, to commence the publication of a Journal devoted to Pharmaceutic research, the undertaking was entrusted to a Publication Committee, with instructions to publish a number as often as a sufficient quantity of original matter should accumulate in its hands.

Four numbers were printed at long and irregular intervals under this arrangement, which was at length suspended from circumstances inseparable from the plan adopted of depending principally upon original essays and researches.

Notwithstanding this temporary abandonment of the undertaking, it was at the time believed, that by a regular periodical appearance of the Journal, and by making it to consist chiefly of extracts from foreign scientific works, the design of the College in authorising the publication would be fully attained.

The wants of society and the profession demand some medium by means of which knowledge, so valuable and in-

teresting, may be more widely and speedily circulated, and made more generally accessible.

The College of Pharmacy, therefore, in accordance with these views, purposes to publish a Quarterly Journal, which shall embrace, at once, as much original matter as can be procured in the several branches of science connected with Pharmacy, and the most important discoveries and improvements made in the art by Europeans.

Considering the obvious utility of such a work, the College relies, with entire confidence, upon the friendly and liberal support of those who, from education and necessity, are interested in the prosperity of Pharmacy. And from the zeal displayed, and talent enlisted in the cultivation and improvement of every department of medicine, the College is persuaded that the members of the medical profession will not regard with indifference an undertaking calculated to give certainty and efficiency to one of the most important branches of their science.

The subjects to be embraced in this journal will be those strictly connected with Pharmacy. Chemistry (General and Pharmaceutic), Materia Medica, Zoology, Botany, and Mineralogy, are the legitimate objects of the Pharmaceutist, and form the elements of his art.

Original essays upon any of these subjects will always be gladly received; and copious extracts and translations will be made from the journals published at home and abroad.

The Journal will be published quarterly, in an octavo form; each number to consist of 80 pages. The paper will be of good quality, the type large and clear, and attention paid to neatness in the general execution. Price $2 50 per annum.

DANIEL B. SMITH,
BENJAMIN ELLIS, M.D.
CHARLES ELLIS,
SAMUEL P. GRIFFITS, Jr,
} Committee of Publication.

Original Communications.

On Copaiba. By Elias Durand.—Read December 30, 1828.

This oleo-resin, improperly called balsam, is procured by incision, made during the warm season, in the bark of the trunk of the copaifera officinalis, L. a tree belonging to the natural order *leguminosæ*, and the tenth class, first order, of the sexual system of Linnæus. This tree grows in South America, and in some of the West India islands, where it has been, probably, naturalized.

The best copaiba comes from Brazil, and is furnished by the oldest trees. It has an oily consistence, more or less thick, according to its age and that of the trees from which it may have been extracted. It is transparent, of a yellowish colour, and has an aromatic, but rather an unpleasant smell; its taste is bitter and acrid, leaving an impression on the palate of a warm and most revolting nature. Its specific gravity has been fixed at 0.950, but it differs in this respect according as it is more or less fluid. That which I tried possessed all the characters of genuine copaiba, and I found it to be very nearly of the same density as distilled water. Immersed in this liquid, it sunk in globules, and at times formed a column from the bottom to the surface; but when slightly warmed, the copaiba invariably rose to the top, to sink again on cooling.

It requires twenty-five times its weight of alcohol of 35° of Baumé's areometer to effect a perfectly transparent solution, leaving behind an insoluble fatty matter, which precipitates in the form of semifluid, transparent, and yellowish

globules, not soluble in any additional quantity of the same menstruum; but the whole of the copaiba dissolves in ether, absolute alcohol, and essential oils. On mixing a watery solution of litmus with cold copaiba, no change is observable in this solution. By warming the mixture, a slight reddish hue appears, and the addition of alcohol developes instantly a lively red colour. If, instead of a watery, an alcoholic solution of litmus is used, the red colour is immediately produced, and a few drops of ammonia, mixed with this oleo-resin, soon loses its pungent smell, and seems to have entered into a combination.

"When mixed with one-seventeenth of pure magnesia, it acquires a degree of solidity sufficient to allow it to be formed into pills."—*Revue Medicale.* This mixture requires six or eight hours to thicken, and in time becomes still more solid. Its specific gravity is raised to 1059. Magnesia seems to act especially upon the resin, and to this may be mainly attributed the solidification. When the oil is distilled off from the solidified copaiba, it rises in a dense cloud, filling the body and a part of the neck of the retort, and the resin becomes almost solidified, while still warm. By stopping the process at this stage, a portion of the oil may be removed in a fluid state, by pouring from the retort while the resin remains in a condition approaching solidity. The resin thus produced cracks as it cools, and becomes of a flinty hardness when cold. No other article, except *perfectly pure magnesia*, accomplishes this solidification. Potassa, soda, lime, ammonia, their carbonates, and that of magnesia, do not; but they generally form saponaceous compounds, capable of being suspended in water, and resembling a mucilage of gum arabic.

This mucilaginous appearance of copaiba, when treated with alkalies, was proposed to the School of Pharmacy of Paris, as a criterion for discovering the sophistication of the article. I have made a number of experiments in relation to this particular point, on mixtures of copaiba with the principal substances with which the article is likely to be

adulterated, and I have found that the solidification by pure magnesia was an excellent test for ascertaining the presence of a fixed or essential oil. There is, then, no complete solidification, but only a production of a thick consistence, resembling that of a viscid mucilage. Lime water, by long contact with this oleo-resin, converts it into a substance similar to soft white wax.

Bergius says that "two pounds of copaiba gave twenty ounces of essential oil, and twelve of dry resin." These proportions must undoubtedly vary, according to the quality of that substance. I scarcely obtained eight ounces to the pound from the sample I subjected to experiment, and in this respect I am in accordance with several writers on the same subject. It is mentioned in Neuman's Chemistry, page 285, that "it is observable that, on mixing the copaiba with the watery spirit of sal ammoniac made by quick lime, a frothing or effervescence ensues, stronger, and of a longer continuance, than that produced by the same spirit with any other natural balsam, and that by this mark we may distinguish the genuine drug from the resin of turpentine of the fir tree, which is frequently mixed with or vended for it." I have not found this to be the case with the aqua ammoniæ, which I think must be the spirit alluded to, on account of the expression "*made with quicklime;*" but I obtained a very evident effervescence by mixing the liquor sub-carbonatis ammoniæ, formerly called spirit of sal ammoniac, with a solution of copaiba in ether. The turpentines, &c. may always be easily detected by their smell by experienced pharmaciens.

Copaiba seems to be composed of an *essential oil* forming about one-half of its weight, a *resin*, a small quantity of *acid* possessing the characters of *acetic acid*, a *fatty matter*, traces of *muriate of lime* and of a *sweet substance.*

The essential oil is obtained by distillation, and passes over at a temperature of 228° Fahr. It is limpid and colourless, marks 25° on Baumé's areometer. Its specific gravity is 0.880. It is volatile and inflammable, possessing a pecu-

liar taste and smell, and is far less bitter and acrid than that of the essential oil of turpentine. Cold alcohol dissolves one twenty-fifth of its weight; but when boiling, more than double this quantity, part of which precipitates on cooling. Sulphuric and nitrous ethers take up about their own volume. It mixes with alkalies, and does not redden the tincture of litmus.

It is an *excellent solvent of caoutchouc. Potassium is not affected by it.* Indeed this oil, well rectified, is far preferable to any purified naphtha I have been able to procure, as a means of preserving potassium*. We may infer from this circumstance, that the essential oil of copaiba does not contain oxygen, and that it is composed exclusively of hydrogen and carbon, with perhaps a trace of nitrogen. It seems to contain carbon in a greater proportion than the oil of turpentine.

In the Edinburgh Encyclopedia, article Copaiba, it is stated, that "the experiments of Shenberg have rendered it probable that this substance is decomposed when distilled along with water, and that both the oil and resin are mere products." I am not informed as to the nature of Shenberg's experiments, but I have no doubt that he is mistaken on this point. Copaiba distilled either with water, alcohol, or per se, gives invariably the same products.

It is difficult to distil it with water, on account of the difference in the densities of the two liquids when heated, and in the degree of heat at which they assume the state of vapours. As the water boils at a temperature much below that requisite to vapourize the oil, it has to force its way through the viscous mass of copaiva, producing flaws and detonations, and throwing at times both copaiva and water into the receiver. In the distillation with alcohol, about one-half of the spirit passes first, almost in a state of purity, then the remainder, together with some essential oil in solu-

* The surface of potassium is commonly altered in the naphtha, and converted into a black crust; but in oil of copaiba, it retains all its metallic lustre.

tion, and lastly the oil alone, which sinks. The distillation per se is preferable, and more expeditious, but the oil requires to be redistilled when the operation has been carried too far; but I have observed in this latter process, that the oil becomes coloured towards the end, as is mentioned in a note to Neuman's Chemistry, page 285, where it is said that "it is observable that the copaiba, being distilled in a retort, gives over, towards the end of the operation, an oil of a fine blue colour, preceded by a limpid and yellowish or brownish one." I have not found this to be exactly the case, but the slight difference may have proceeded from the degree of heat applied. I employed a glass alembic, in a sand bath, at a temperature between 230° and 250° Fahr. The operation was slow, and the first product quite colourless, but the oil gradually acquired a greener appearance. I received separately the last product, which was of a lively greenish blue colour, possessing a stronger taste and smell of the copaiba than the colourless oil. By a redistillation of the whole, a pure oil, without colour, may be obtained, leaving in the retort a residue, of a brown resinous appearance. The blue oil acted slowly on the potassium, which was at last completely dissolved, and had then acquired a deep brown hue.

The resin, when reduced to dryness, is tasteless and inodorous; it dissolves in alcohol, and leaves behind a fatty matter. By adding to it the exact proportion of essential oil which had been withdrawn by distillation, it forms a new compound, more highly coloured than the copaiba, but possessing a still greater fluidity and lightness, and very near the same smell and taste, with the property of solidifying with pure magnesia. The resin retains a great proportion of the acid, as I have ascertained by the strong effervescence produced when its alcoholic solution is mixed with carbonates, and its powerful action on litmus. Its medicinal properties are more than doubtful.

The Edinburgh Encyclopedia mentions, that the resinous matter, when distilled, yields a yellowish thick oil; some

acidulous water; a gas, one-sixth of which is carbonic acid gas, and the remainder an olefiant gas.

The existence of an acid in copaiba seems to be satisfactorily demonstrated by several of the above results. If it does not exist in combination with the resin, it is at least so intimately associated with it, that its character is masked. Dr Staples was good enough to perform for me the following experiments, and to this gentleman I am indebted for several others mentioned in this paper.

Experiment 1. He boiled a small proportion of the copaiba, for a few minutes, with eight or ten times its bulk of alcohol; upon cooling the alcohol became gradually clear, and a few globules of the copaiba subsided. A portion of the alcohol having been poured into six or eight times its weight of water, the whole became milky, which appearance it retained with pertinacity. Part of the milky fluid was passed through a double filter, but it still retained its opacity to a considerable degree. Upon trial of this filtered liquor with a solution of litmus, it changed to a cloudy red.

Experiment 2. To about four ounces of boiling alcohol of 35° Baumé's areometer, copaiba was added to saturation; while still hot, protoxide of lead was added in small quantity, and the alcohol was then removed by distillation. A small portion of water introduced towards the close of the operation was separated when cold by the filter, and upon examination was found to contain acetate of lead in solution.

Experiment 3. Having removed from copaiba by distillation about one-third of its bulk of oil, and a small portion of acid, the resinous substance remaining in the retort was acted upon by boiling alcohol of 35° until nearly the whole was dissolved. The alcohol was then separated; and when still hot protoxide of lead was added. Upon removing the alcohol by evaporation and adding towards the close a small portion of pure water, this menstruum, when cold and sepa-

rated from the copaiba by a filter, contained acetate of lead.

No account that I have read or heard of gives to the acid its true character*. Indeed those who speak of the products of copaiba by distillation seem to leave us to infer, that the acid is not suspected to exist in this substance; a few merely observing that acidulous water is found in the retort.

This acid passes in the distillation at a temperature below 212°, and continues to pass together with the oil, from which it separates and sinks. It exists in a very small proportion, and is certainly not a product of distillation, as a comparatively large quantity remains in the resin with which it is intimately blended. If otherwise, it would be removed at the earlier stage of the distillation, even before the heat rises sufficiently high to boil the copaiba. How is it that alcohol liberates the acid from the copaiba, if it is not by separating the particles of that substance, so as to enable the acid to act on the bodies with which it is in contact? The acid obtained by distillation has the taste and smell of the acetic acid; it unites with the protoxide of lead and forms a soluble salt having all the characters of sugar of lead.

The fatty substance is soluble in ether, absolute alcohol and essential oils, but not in water or any quantity of alcohol of 35°. It is greasy to the touch, of a light yellow colour, possesses a strong taste of copaiba, and leaves a very irritating and lasting impression on the palate. It is sepa-

---

* Since the reading of this paper before the College of Pharmacy, I have found that, "from the experiments made upon the natural resins by M. Bonastre, one of the most eminent apothecaries of Paris, these substances were composed of the following principles: 1, a volatile oil; 2, an acid (the acetic and frequently succinic in the products of coniferous trees); 3, a resin soluble in cold alcohol; 4, a sub-resin opaque, almost always insoluble in boiling alcohol and ether; 5, and lastly, a bitter extractive containing several salts." The coincidence of these results with those I have obtained in the present analysis, corroborates the accuracy of my experiments upon copaiba, which is nothing else than a natural resin.

rated from copaiba by dissolving the latter in alcohol, and from the dry resin by the same means; but when obtained from the latter it has a more intense colour. By drying it becomes more consistent and adhesive.

The decoction of copaiba in distilled water has an aromatic smell and a pure bitter taste. It gives no indication of acidity when filtered and evaporated, but is found to contain a small portion of balsam, and a sweetish substance in small quantity, without any gum. When treated with a little distilled water to test the presence of any saline substance, muriate of lime appeared to be dissolved; for upon trying the solution with oxalate of ammonia and nitrate of silver, a precipitate was immediately formed. This solution was not affected by muriate of baryta.

The disgusting taste of this valuable medicine which is as yet considered the best of the remedial substances exhibited in chronic blennorrhea and other mucous discharges from the urethra, has been a source of great annoyance to patients as well as practitioners. It has been associated with different substances, with a view to cover its revolting smell and savor, and correct its irritating action, without much success. Indeed no medicine has, on these accounts, more completely tried the patience and baffled the ingenuity of physicians and pharmaceutists.

The resin, under the name of extract of copaiba, has been administered in pills. I prepared some two years ago, at the request of several physicians, and although it was not deprived entirely of its oil, it was soon ascertained that the properties of the drug had been considerably impaired by the operation to which it had been subjected. I know of but one instance in the medical practice of this city, of the employment of the essential oil. It was prepared by the physician himself for his own patients, to whom, as he has assured me, it proved in every instance beneficial.

It was introduced last year to the French practice by M. Dublanc, Jun.; and the Revue Medicale mentions the happy

results of its use. Drs Bard and Cuellerier witnessed its effects in thirty patients, who were cured in five or six days. Like copaiba itself the essential oil often produces alvine evacuations, which counteract its remedial effect. M. Dublanc thinks he has succeeded in preventing this action, which seems to be unfavourable to the cure, by the employment of the following mixture:

℞.—Syrupi tolutani, ℥ij.
Aquæ menthæ piperitæ,
Spiritus olei essential. copaibæ, aa ℥iij.
Extracti opii, gr. j.

Fiat mistura. Signa—from three to six table spoonsful a day.

M. Dublanc says that he forms his spirit of essential oil of copaiba, by distilling one part of the oil with two of alcohol, without mentioning whether the whole formed an homogeneous preparation. I have repeated his process with alcohol of 35°; but I found that excepting one twenty-fifth which remained in solution in the alcohol, the oil separated in the receiver, as I had previously ascertained by the direct mixture of both these substances.

This solution is not unpleasant, and may be administered alone, or in conjunction with the tincture of cubebs or with syrup. The formula of M. Dublanc affords a palatable mixture. An emulsion may also be formed in the following manner:

℞.—Olei essential. copaibæ, ℥ij.
Pulveris gummi acaciæ, ℥ss.
Aquæ cinnamomi, ℥ij.
Syrupi simplicis, ℥iss.
Tincturæ opii, ℥ss.

Misce. Signa—dose a table spoonful.

These preparations of the essential oil are by no means so unpleasant as those of the copaiba, and deserve to be fairly tried by our medical men. The copaiba, solidified by its union with magnesia, has the great advantage of being prepared without much trouble or expense, and of offering

a pilular consistence, free from the disgusting and sickening taste of the copaiba. Its medicinal properties are not in the least impaired by the small proportion of one seventeenth of pure magnesia, and it presents many advantages, together with the oil or the spirit, to medical practitioners. They have of late been prescribed, and several physicians have reported favourably as to their efficacy.

Observations on Opium, and some of its Constituents. By Edward Staples, M.D. Read February 23, 1829.

The researches of MM. Derosne, Sertuerner, Robiquet, and other chemists, have shown that there exist in that highly complex drug opium, intimately connected with a variety of other substances, two bodies of the highest importance to chemists and physicians: besides which others of minor importance are recognised, viz. resin, fixed oil, a substance resembling caoutchouc, a vegeto-animal substance, mucilage, fecula, vegetable fibre, meconic acid, extractive, and, according to researches not fully disclosed, made by M. Robinet*, codeic acid, meconate of soda, and even cyanogen†.

It is intended, on the present occasion, only to notice directly, the two most important substances found in opium, viz. morphia and narcotine, incidentally referring to others of minor importance; as the chief object in view is to draw some practical deductions from experiment and observation, applicable to the preparation of these important proximate principles.

Before entering upon the consideration of the immediate objects in view, it is not improper to make a few remarks

---

* Formulaire, par F. Magendie, cinquième edition.

† Probably an erroneous conclusion.

relating to extractive. This substance, now distinguished from vegetable extracts by the term extractive principle, of the existence of which, as a peculiar vegetable substance*, eminent chemists have expressed their doubts, and which M. Magendie has discarded from the substances enumerated as constituents of opium in his formulary, was, by M. Sertuerner, who first pointed out the alkaloid character of morphia, estimated, in consequence of its peculiar association with other substances in opium, as one of considerable importance: his researches were the result of elaborate experiments, and his opinion is certainly entitled to much respect. It is certain that morphia, in the state in which it exists in opium, carries into all its solutions a substance answering to the usual indications of extractive. If the tincture, or aqueous solution of opium be treated with a solution of acetate of lead as long as any precipitate is produced, and the precipitate separated by filtration, and sulphuretted hydrogen be passed through the filtered solution to separate a portion of the precipitate remaining, this coloured liquor, when the sulphuret of lead has been removed, will be changed to a green when a solution of the sulphate of iron is thrown into it. Its colour will also become darker with solutions of ammonia; and chlorine will produce a precipitate without destroying all the colour. The precipitate thus produced is of a dark yellow. Hydro-chlorate of tin and the tincture of galls act energetically on the solution above alluded to; the latter, no doubt, in consequence of the presence of morphia. The best method to be pursued, in order to obtain morphia from tinctures, or solutions of opium, after their union with saccharum saturni as a precipitant, as also the peculiar situation of narcotine when the acetate of lead is used, will be introduced subsequently.

Having succeeded nearly two years since in obtaining morphia in a crystalline form, and in a state almost pure, by immediate precipitation from a combined acetic and alco-

---

* Thenard, Traité de Chimie. Tom. V. p. 236.

holic solution, a process for its production was presented to professor Barton for publication, in October 1827, in an appendix to the synopsis of his lectures on materia medica. The outlines of the process were also published in the North American Medical and Surgical Journal, in the fifth volume*. The peculiarities distinguishing the process above alluded to from the numerous other methods devised by pharmaceutists for the preparation of that important proximate principle, morphia, are the solution of the morphia as it is combined in opium, in alcohol, and acetic acid, and the *suspension* of the colouring matter and other inert substances, copiously thrown down by every other process. It was not supposed that the process in the form there detailed resulted in the production of all the morphia contained in opium subjected to it; no method heretofore devised has attained that object. The morphia inevitably lost by repeated washings, by alcohol and water, of heterogeneous precipitates in other processes, remained probably in solution, in the alcohol too copiously used in that.

The effectual suspension of the colouring matter and resin in an acetic tincture, highly charged with the latter, (the resin,) and the satisfactory precipitation of the morphia, in crystals, led to further experiments, with solvents so modified as to preclude, in part, the resin, subsequently introducing a smaller quantity of alcohol, to suspend the colouring matter and other inert substances soluble in water or diluted vegetable acids. Following the above suggestions, it will be seen by the details to be made, that a very large and satisfactory product will result, and that a little practice will enable persons with moderate chemical skill, and an apparatus of a very humble order, to prepare the most important of the substances found in opium.

---

* M. Chevallier repeated the experiments alluded to, and communicated them to the section of pharmacy of the French Academy of Medicine in July last. He obtained a greater quantity than was there mentioned. Vide Vol. V. of the North American Medical and Surgical Journal.

The best opium, in a state of perfect dryness, is readily dissolved in water by a protracted digestion, at a temperature of about 70° Fahr. That of medium quality, which in commerce is far more abundant than the superior kind, requires, for its successful treatment, diluted vegetable acids, while inferior opium, especially if contaminated by admixture with substances readily acted upon by the two solvents before named, demands the use of alcohol, either alone, or in combination, as the first solvent. When alcohol is employed alone, or in combination, as the first solvent, the resin should be removed in a manner subsequently to be noticed, in order satisfactorily to produce the morphia. It is the resin present in the alcoholic solution, employed according to the formula of M. Guillermond*, that highly contaminates the precipitate thus obtained, and constitutes the objection to his process. M. Guillermond strongly enforces the employment of the method alluded to above, as a convenient plan for the examination of opium; having succeeded in the production of a considerable quantity of morphia from half an ounce of this drug. The commendation which he has given of his process, for the analysis of small portions of opium, applies with greater force to the more simple plan subsequently to be related, by which twenty grains of opium, and even less, are sufficient to display its simplicity.

One thousand grains of opium, in pieces of the size of a nutmeg, sufficiently dry to be readily broken, were digested with occasional stirring in eight ounces of distilled water, during six days, in a temperature of from 60° to 70° Fahr. The solution was then thrown upon a coarse paper filter, previously washed and moistened with pure water, when a highly coloured transparent liquor was obtained, measuring six ounces and a half, of specific gravity 1043. This solution was combined with six and a half ounces of alcohol, of 35° Baumé; its transparency was unaffected, and the temperature of the combination rose eight degrees; conden-

---

* Journal de Pharmacie, No. VIII. Aout 1828.

sation also took place of 49 into 48 parts. Immediately after the combination of the solution with alcohol, two drachms of aqua ammoniæ, of specific gravity 950, united with six drachms of alcohol of 35°, were thrown in and intimately mixed. No visible change took place, except that the colour became rather darker; but in the course of half an hour crystals began plentifully to form. After a few hours had elapsed, two drachms more of aqua ammoniæ, similarly combined with alcohol, were thrown in, and the whole suffered to rest twenty-four hours. The crystals then, separated by a filter, and washed with a few ounces of pure water, weighed*, when dry, one hundred and thirty-eight grains. The crystals were uniform in appearance, a little darker than nankin colour; when tried with nitric acid, they assumed the colour of arterial blood, and nitrogen was disengaged. The dregs of opium remaining on the filter were washed with four ounces of pure water, passed and repassed through several times, until it no longer acquired colour. A solution much lighter than that obtained by the first filtration was the result, of specific gravity 1013. This solution was combined with one ounce and three-fourths of alcohol of 35°. One drachm of ammonia, of specific gravity 950, was united with three drachms of alcohol of 35°, and thrown in after a few hours. Another drachm of aqua ammoniæ, similarly united, was also thrown in, and in twenty-four hours the crystals were collected, washed, dried, and tested. They were uniform in appearance, weighed twenty grains, and, like the first described, were changed to red by nitric acid. The dregs still remaining on the filter were digested in alcohol of 35° for several days in a temperature about 70°;

---

* Opium of very superior quality, when thus treated, afforded about eighteen drachms of precipitate to the pound of opium, and this about fifteen drachms of morphia. Several physicians have used the first precipitate with much satisfaction.

M. Robiquet only obtains seven drachms from the Paris pound by his process, and that from the best opium.

Mr Brande, from a carefully prepared specimen of English opium, obtained eight drachms.

the amount of alcohol eight ounces. The alcohol was removed by filtration, and the dregs washed with two ounces of alcohol several times passed through, to remove all the colouring substance, &c. dissolved. This highly coloured tincture was reduced by distillation to two ounces, and the resinous substance, &c. insoluble in water, separated by six ounces of that fluid cold. When filtered a very dark substance remained upon the filter; the solution slightly alcoholic was of a transparent light brown colour; about half its bulk of alcohol was added, and ammonia to the amount of two drachms of the water of specific gravity 950 combined, as in the former experiments. A crystalline substance was obtained which by merely washing with water became nearly white. When tried with nitric acid it dissolved slowly, became of a light yellow, and nitrogen was not disengaged in perceptible quantity. The amount obtained did not exceed twenty grains. It proved to be a vegetable product only, and without doubt narcotine.

Two hundred and fifty grains of opium, similar to the subject of the last experiment, were digested six days in two ounces of common distilled vinegar*, in a temperature about 55°; afterwards it was filtered and treated in all respects according to the first of the three stages of the preceding experiment, and the dregs washed with a small portion of diluted vinegar. The specific gravity did not essentially differ from the watery solution in the previous experiment. An additional quantity of water of ammonia was used to saturate the acetic acid. The result of this experiment was thirty-five grains of crystals uniform in their appearance, of a nankin colour, and when tried with nitric acid becoming red, with other marks of morphia.

Five hundred grains of opium of medium quality were digested in two ounces of distilled water until entirely bro-

---

* Instead of distilled vinegar citric or tartaric acid may be used:—80 to 120 grains are sufficient for 1000 grains of opium. Strong acids cannot be substituted, as their action is too energetic on resinous substance, &c. in opium.

ken down; then three ounces of distilled vinegar were added and the digestion continued several days. Upon filtering the coloured acidulous solution and treating it in all respects as the subject of the last experiment, fifty-six grains of crystalline precipitate of a nankin colour were obtained, similar in its character to the other precipitate of the same colour.

The precipitates procured by either the watery or acetic solvent may be rendered white by solution in boiling diluted alcohol*. Five parts of alcohol of 35° to three parts of water will be found to answer better than more concentrated spirit. The crystals have a better appearance when diluted alcohol is used than when alcohol of 35° is employed. I have obtained from the nankin coloured crystals five drachms of pure morphia from six drachms, without selecting the portion deposited from the alcoholic mother liquor, which does not yield all it holds in solution for several days; the quantity however thus remaining dissolved is inconsiderable.

A more convenient and satisfactory method of rendering the morphia pure and white will be found in the solution of the coloured crystals in diluted alcohol, slightly acidulated with sulphuric acid. Four ounces of the liquor will suffice to purify two drachms. The liquor should be heated to facilitate the complete solution. Weak ammonia in a small portion of diluted alcohol may be added while the fluid is quite warm.

The colouring matter and other inert substances taken up by water when pure opium is the subject of experiment, and by any diluted vegetable acid, when that of an inferior grade is to be treated, are effectually suspended by the aid of a small portion of alcohol. The ammonia, when introduced in the attenuated form recommended, seems also to favour the effectual suspension of a coloured substance

---

* The apparatus of professor Hare for filtration at a boiling heat will be found very useful in purifying morphia. Vide his Chemical Compendium.

which gradually forms and precipitates as the excess of ammonia escapes; especially when water alone has been employed as the solvent, this precipitate naturally forms in two or three days after the morphia has been separated.

Ammonia or any other alkali, when thrown into a solution of opium in a form sufficiently concentrated to act with energy, exerts itself more upon the colouring matter than upon the solvent of morphia, and this latter substance may be obtained from the supernatant liquor as well as the precipitate. It may perhaps be remarked that alcohol will also be liable to objections on account of its power as a solvent of morphia. Cold alcohol acts very feebly on uncombined morphia, and when saturated with colouring matter, its solvent power is scarcely appreciable; the less soluble substance (morphia) being the more effectually precipitated in consequence of its presence. It may be further remarked that by concentrating the solution of opium in the manner directed by M. Robiquet, the loss attendant on the supernatant liquor still holding morphia may be obviated; and by reference to the formula of that distinguished chemist, it will be seen that he directs the preparation of an extract from the supernatant liquor, which he considers still to possess some of the virtues of opium. When lime has been employed as a precipitant of morphia from the diluted hydrochloric solution of opium, in order to obtain a satisfactory result it has been found necessary to precipitate the excess of lime by carbonic acid gas.

Besides the advantage of more effectually precipitating the morphia by suspending the colouring matter, &c. another of scarcely less importance is attained, viz. the effectual solution of more colouring matter by a smaller quantity of alcohol than would be sufficient to dissolve colouring matter unaltered by precipitation. But is the colouring matter unaltered by precipitation when caustic alkalies are used? It seems to be essentially altered, and rendered much less soluble by the energetic action of alkalies; and this will explain the great difficulty in its removal in order

to obtain the morphia pure, when according to all previous formulæ it has been precipitated; it will also throw some light on the source of loss generally admitted as unavoidable in the preparation of morphia. From that which precedes it will be seen that water acts energetically as a solvent of pure opium even in very limited quantity, that acids frequently assist the solvent: and that very inferior opium often demands the aid of alcohol as the first solvent. In the latter case it will be well to submit the opium to its action in the following manner. One part of opium to one part and a half of water for two or three days until it has become broken down, then add about six parts of alcohol of 35°. After a further digestion for three or four days, with frequent stirring, filter and wash the dregs on the filter with two ounces of alcohol several times passed through; then concentrate the tincture to about one third its bulk by distillation, and separate the resin by about six ounces of pure water. After the resin has subsided, add alcohol to suspend the colouring matter, and proceed to obtain the morphia in the same manner as when water or diluted acids have been the first solvent; if the resin is not removed as has been before remarked, the product will be much contaminated by impurities.

Narcotine.

It has been shown that when opium is treated by a small quantity of water, nearly if not quite all the morphia is dissolved, while a portion of narcotine is retained in the dregs of the opium, and may be from them obtained by the aid of alcohol. It may also be obtained by evaporation when opium has been dissolved in a large quantity of alcohol, and the resin separated in the manner directed in the treatment of inferior opium. After the resinous substance has been thus removed the narcotine* will crystallize and fall down when evaporation is pursued sufficiently. The morphia in

---

* Thus form the salt of Derosne.

this case remains in solution intimately united with the colouring matter, while the narcotine crystallizes in the highly coloured menstruum comparatively free of colour. This illustrates the opposite characters of these two important substances.

Narcotine may also be obtained by the use of ether after the method adopted by professor Hare or that of M. Robiquet, and by the aid of oil of turpentine, as the following experiment will show.

One part of opium, perfectly dry and in fine powder, was thrown into sixteen parts of oil of turpentine heated to 212°, at which temperature it was retained, with frequent agitation, thirty minutes. The oil of turpentine was then separated by filtration, and it had acquired a light brown colour. When submitted to distillation, and united with alcohol, to favour the separation of the turpentine from the substances *it* had removed from the opium, and reduced to about four ounces, half of which was alcohol, upon slowly cooling, crystals of narcotine formed in the retort. Besides the narcotine, oil of turpentine also removes from opium a small quantity of coloured resin. Morphia may be readily obtained from opium after its treatment with oil of turpentine, as above stated

Narcotine is dependent for its solution, in the state in which it exists in opium, upon some substance removed or altered by the addition of acetate of lead. From the tincture and solution, copious precipitates were produced by a solution of the acetate of lead. By removing the excess of precipitate, or charging the new compound formed with sulphuretted hydrogen, crystals of narcotine collected on the sides of the vessel. Narcotine was also obtained from the sulphuret of lead, by digesting it in ether. It seems, from the latter fact, that narcotine forms a soluble compound with a solution of acetum plumbi, from which it separates when sulphuretted hydrogen is introduced.

Minutes of the College.

30*th December* 1828.—An essay on copaiba, by Elias Durand, was read and referred to a committee for examination.

A report was read by the committee appointed at the last meeting to inquire into the expediency of opening a loan for $1000, for the purchase of chemical and pharmaceutical apparatus for the use of the lectures, which was not acted upon.

27*th January* 1829.—The committee to whom was referred the essay on copaiba reported in favour of its publication; and "observe, with respect to the consolidation of this oleo-resin, that it is not only necessary the article should be pure, but that the magnesia be absolutely deprived of carbonic acid. If the latter have not been recently calcined, it is necessary, in order to secure the desired result, that it be subjected to a red heat for five or ten minutes in a crucible, and mixed with the copaiba immediately after it becomes cold."

The report of the committee in favour of opening a loan for $1000 was adopted, and the following is extracted from its preamble:

"The committee, to whom was referred the subject of the propriety of purchasing an additional chemical apparatus, report,—that having attentively examined the subject, they are of opinion that the interests of the college are inseparably connected with the respectability of the school of pharmacy, and that it is to the influence which it will exert by means of this school, that the college is to look for the principal sources of its future prosperity and importance.

The advancement of the means of instruction is therefore a duty which the college, if it regard its own interest, can never overlook. Every opportunity should be seized for impressing upon the apprentices the necessity of attending the lectures, and of rendering the lectures more useful and popular. As the experimental illustrations of the science of chemistry form one of the most attractive and instructive exhibitions that modern science affords, your committee think they cannot too earnestly recommend the adoption of measures to place the lectures of this department on a footing of equality with those of our best colleges and schools. The apparatus now employed is not only clumsy and imperfect, but the lecturer is obliged to pass over, without illustration, some of the most interesting and important topics on which he descants. Had he at his disposal a proper collection of apparatus, your committee feel assured that the immediate effect would be an increase in the class from the ranks of the medical students and amateurs, whose matriculating fees would contribute towards paying for the expenses incurred. Your committee have consulted with the professor of chemistry on the subject, who has furnished them with a list of apparatus which he thinks necessary; the cost of which as far as can be ascertained by a rough estimate will not exceed one thousand dollars. The Philadelphia College of Pharmacy has now been in existence for more than eight years; during that period it has with slender funds and through many discouraging circumstances effected more for the improvement of American pharmacy than all that has before been done or attempted in this country. It has produced union and concert, a more liberal spirit, and more elevated views among the apothecaries of Philadelphia; it has had the honour of establishing the first school of pharmacy which this country has seen; it has established the first and only journal devoted exclusively to the science and art of the profession; it has resolved a company of shopkeepers into a scientific association, the inspiring influence of which we are just beginning to feel; it has

founded a valuable professional library; and, more than all, it has educated a race of young men, with more accurate science, and more extensive knowledge, than their predecessors, and who are just coming upon the stage of action, and enrolling themselves as members of the institution, which they must regard as their alma mater, in whatever part of the world their future lot may be cast.

"It is from the combined influence of all these causes that your committee anticipate a more prosperous era in the history of the college, a more cordial co-operation, and more efficient and liberal support.

"With these views the present appears to the committee the proper time for attempting to make another great step towards the accomplishment of our views."

24th February 1829.—A report from the committee appointed to examine Samuel Allison's essay on the "protoxide of mercury, and the atomic weight of that metal," was adopted, and the essay referred to the publication committee.

An essay upon morphia and narcotine, by Dr Staples, was read and referred to a committee.

31*st March* 1829.—The following gentlemen, whose names were proposed at the last stated meeting, were duly elected foreign honorary members of this college, viz: Messrs Vauquelin; Derosne; Robiquet; Virey, M.D.; Pelletier.

The committee to whom was referred the essay of Dr Staples reported in favour of its publication.

A report from the publishing committee was adopted, and the committee directed to proceed to the publication of the Journal, with the present number of subscribers.

The following gentlemen were duly elected officers, trustees, &c. for the ensuing year:

President,—Daniel B. Smith.

Vice Presidents,—Dr Samuel Jackson, Henry Troth.

Secretary,—Charles Ellis.

Treasurer,—Edward B. Garrigues.

Trustees,—Alexander Fullerton, Jr; Elias Durand; William Biddle; Joseph Reakirt; Warder Morris; John Carter; Charles H. Dingie; William Marriott; Samuel P. Griffitts, Jr, for the unexpired time of Henry Troth, elected Vice President.

Publication Committee,—Benjamin Ellis, M.D.; Daniel B. Smith; Samuel P. Griffitts, Jr; George B. Wood, M.D.; Charles Ellis.

Selected Articles.

Medico-Botannical Society.

The last general meeting of the eighth session of this society was holden on Friday the 11th of July, at its apartments 32 Sackville street, Piccadilly : Sir James M'Gregor, M.D. F.R.S. President, in the chair.

The following gentlemen were elected to be professors during the ensuing session :

Professor of Botany, John Frost, Esq. F.R.S.E.; professor of Toxicology, George Gabriel Segmond, M.D. F.S.A. F.L.S.; professor of Materia Medica, John Whiting, M.D.

A paper entitled "remarks on the doubtful identity of bonplandia trifoliata of Willdenow, and Humboldt and Bonpland, and the Angostura or Carony bark tree," in a letter addressed by Dr John Hancock to the president and fellows of the Society, was read.

Dr Hancock who, during the year 1816, resided for several months in the district in which grows the plant yielding the bark known in pharmaceutic language by the name of cortex Angosturæ vel cuspariæ, and directing his attention to this subject, discovered several material discrepancies between the tree he observed, and the description of a tree said to produce the drug, and of which baron Alexander Humboldt, in other respects such an accurate observer, sent specimens obtained from Carony to professor Willdenow, of Berlin ; who, though there already existed a genus of that name, called it Bonplandia, in honour of baron Humboldt's companion. This name was subsequently adopted by Hum-

boldt and Bonpland in their splendid work on equinoctial plants, though the former had previously given it the appellation of cusparia febrifuga. The opinion formed by Dr Hancock was confirmed, on being informed by a gentleman of the name of Don Jose Zereas, with whom the travellers above mentioned lodged, that they did not visit the missions of Carony, but sent down an Indian, who returned with a sample of the leaves of the tree in question, but much to their disappointment, without flowers. The generic character having also become very doubtful to Dr Hancock, he carefully examined its congeners, and found it agree in so many points with the genus galipea of Aublet, that he considered it to be a species thereof, and in his opinion he has lately been confirmed by the arrangement of professor De Candolle, who has classed the cusparia febrifuga, which no doubt is nearly allied to Dr Hancock's plant, under the head galipea. The paper then gave a detailed description of its botanical characters; which, with the figure of the plant and the notice of its great efficacy in several diseases, especially in malignant fevers, dysenteries and dropsies prevalent in Angostura in 1816 and 1817, will be published in the next number of the society's transactions, together with a comparative statement of the differences existing between bonplandia trifoliata (Willdenow) vel cusparia febrifuga (Humboldt and Bonpland) vel galipea cusparia (De Candolle), and the real Angostura bark tree; the most striking of which is, that instead of being a large and majestic forest tree, as described in the Plantæ Æquinoctiales Orbis Novi, the authors of which no doubt thought the tree found by them in the neighbourhood of Santa Fe de Cumana and Nueva Barcelona was the same as that of which they obtained leaves in Angostura, it is a tree, or almost shrub, of not more than twelve or fifteen, and at the most of twenty feet in height, and four or five inches in diameter. The Doctor concludes by proposing that the plant described by him should be named galipea officinalis.

The paper was accompanied by five native specimens of

the bark, leaves, flowers, capsules, and seeds of the plant. The thanks of the meeting were ordered to Dr Hancock, for this very interesting communication.—*Late English Jour.*

On the Means of ascertaining the Purity of Sulphate of Quinia. By R. Phillips, F.R.S. L. & E. &c.

The great demand which has arisen for this important medicine, and the high price at which it is necessarily sold, have excited some, who are careless as to the means by which they acquire gain, to sophisticate it in a vast number of ways, and by every means which talent misapplied could suggest.

Having repeatedly of late been requested to examine various samples of sulphate of quinia, I thought it might be useful to state the several modes which may be employed for that purpose: and I make the present communication with the greater confidence, because I have received the very able assistance of my friend Mr John T. Barry, of Lombard-street, to whose chemical skill, and the opportunity of frequently applying it, I am indebted for the greater number of hints and facts detailed in this paper.

Pure sulphate of quinia has the form of minute fibrous crystals; it is inodorous, and its taste is bitter. If certain vegetable products, such as starch or sugar, be mechanically mixed with it, they may possibly be observed by merely inspecting the preparation with a glass.

1st. If the sulphate of quinia be mixed with a considerable proportion of foreign matter, it may probably be detected by dissolving the salt in question in about three hundred times its weight of water,—say one grain in about five fluid drachms of boiling distilled water. On cooling, pure sulphate of quinia will be deposited in feathery crystals in twenty-four hours, if there be no adulteration.

2dly. As indirect, but as good collateral evidence, the taste of sulphate of quinia of known good quality may be

compared with that of another sample. Thus, when pure, a grain of sulphate of quinia will render nearly a pound and a half of water, or 10,500 grains, sensibly bitter.

3dly. The alkalies, either pure or their carbonates, if but slightly in excess, always occasion precipitation at ordinary temperatures in a solution of sulphate of quinia containing only 1-1000th of its weight, or less than one grain in two fluid ounces of water.

4thly. A solution of tannin occasions a very sensible precipitate in an aqueous solution of sulphate of quinia, containing only 1-10,000th of its weight of the salt, provided there be no acid in excess. Kino is that form of tannin which best answers the purpose. It is, however, to be observed, that the salts of morphia, cinchonia, strychnia, &c. are similarly affected by tannin; but they are not likely to be mixed with sulphate of quinia.

5thly. Sulphate of quinia suspected to contain sugar, gum, or other substances soluble in cold water, may be tried by digesting the same portion of the salt in small and successive portions of water to saturation. If the sulphate of quinia be pure, and the solutions all properly saturated, they will have the same taste and specific gravity; and similar portions will yield by evaporation equal quantities of solid residuum.

6thly. A repetition of the above process, substituting alcohol for water, answers for extracting resin and some other substances, because sulphate of quinia is soluble in alcohol only to a limited extent.

7thly. If a white substance insoluble in cold water be found in the sulphate of quinia, heat the mixture to about 170° of Fahrenheit. This will render starch soluble, and its presence may be determined by the addition of an aqueous solution of iodine, which will immediately occasion a blue colour, and eventually a blue precipitate. The iodine should be added in very small quantity*.

---

* William R. Fisher, a junior apothecary of this place, states that the iodine must also be added very *slowly*. If it is not added "slowly, and in small quantities," the experiment fails.—*Ed.*

8thly. Sulphate of quinia has been adulterated with ammoniacal salts. These are rendered obvious by adding a little of the suspected salt to a solution of potash. If any ammoniacal salt be present, ammoniacal gas will be readily detected, either by the smell, or by holding over the mixture a piece of turmeric paper or a bit of glass moistened with acetic acid.

9thly. To ascertain whether sulphate of quinia contains any earthy salts, such as sulphate of magnesia or sulphate of lime, burn a portion of it in a silver or platina crucible, or even in a clean tobacco-pipe. Any earthy salt, or any matter indestructible by heat, will of course remain in the vessel.

10thly. To ascertain that the sulphate of quinia contains the proper quantity of sulphuric acid and quinia, dissolve a little in pure muriatic or nitric acid, and add a solution of muriate or nitrate of barytes: 60 parts should give about 17.3 to 17.4 of sulphate of barytes; or the method may be varied without the trouble of drying the precipitate. Dissolve 60 grains of sulphate of quinia in water slightly acidulated with muriatic or nitric acid; add a solution of 18 grains of nitrate of barytes, and separate the precipitated sulphate of barytes by filtering. If nitrate of barytes be now added to the clear solution, it should still occasion slight precipitation, for 60 of sulphate of quinia contain 5.8 gr. of sulphuric acid, equivalent to 19.1 of nitrate of barytes.

This test is only to determine that there is no crystallized vegetable matter uncombined with sulphuric acid in the sulphate of quinia; the detection of earthy or alkaline sulphates has already been provided for.

11thly. Sulphate of quinia should lose not more than from 8 to 10 per cent. of water by being heated till deprived of its water of crystallization. Mr Barry informs me that he once examined a sample which contained more than 40 per cent. of water in excess diffused through it.—***London Philosophical Magazine.***

An Account of the Cultivation of Sago in the East.

With the view of expatiating on the rise and progress of this commodity, which, about forty years ago, was almost entirely unknown in a European market, except medicinally, being recommended as a restorative in phthisis and emaciations, we shall commence by describing the nature of the soil and situation which is favourable to it, the progress of vegetation, and the expenses of bringing it to market in its crude state; and subsequently enter into a detail of the process of refinement as practised here, remarking on the cost of labour and profit of manufacture attending its refinement from the first stage to what is called pearl sago, with statements of the import of the farinaceous pith or medulla, and export of the refined pearl sago, with the various uses to which it is applied, and such general remarks as present themselves for consideration.

Growing in an almost wild state, in many places in our immediate vicinity, it claims our particular attention—in the first place, as an article of considerable export; and, secondly, to use Dr Johnson's definition of it, as "a kind of eatable grain," increasing in demand, improving in quality, and in the manufacture of which Singapore, within the last year, has not only surpassed in quality, but exceeded in quantity, that of any other place.

In his "Indian Archipelago," Crawfurd says, Sago is an article of exportation to Europe,—to India, principally Bengal,—and to China. It is in its granulated form alone that it is ever sent abroad. The best sago is the produce of Siak, on the north coast of Sumatra. This is of a light brown colour, the grains large, and not easily broken. The sago of Borneo is the next in value; it is whiter, but more friable. The produce of the Moluccas, the greatest in quantity, is of the smallest estimation. The cost of granulated sago, from the hand of the grower, or producer, is about twice the price of rice in Java, or a dollar a picul. In the market of Malacca, the sago of Siak may be had at from two to three dollars per

picul. The sago of Borneo has been sold to the European merchant, in Java, as low as one dollar and three-quarters a picul. The foreign exporter will be able to ship the former at from three dollars and a half to four dollars and a half per picul. It may here be worth mentioning, that, within the last few years, the Chinese of Malacca have invented a process by which they refine sago, so as to give it a fine pearly lustre. Not above four or five hundred piculs of this are manufactured. It is thought that it may be obtained at about six dollars per picul, when the supply is more equal to the demand. A small quantity of it exposed for sale in the London market, in 1818, sold for about thrice the price of ordinary sago.—Vol. iii. page 348. And he describes the sago palm, (metroxylon sagu,) as a native of that portion of the Archipelago in which the easterly monsoon is the boisterous and rainy one—as the eastern portion of *Celebes*, and Borneo, to the north of Mindanao, to the south of Timur, and to the east of New Guinea, and says, that the great island of Cerum is of all others most distinguished for its production. He doubts it being indigenous in the western parts of the Archipelago, and draws some curious and interesting inferences from the various designations under which the sago palm is distinguished in the different languages of the islanders, tending to prove that in the western parts it is an exotic. He gives a sketch of the sago harvest, and the modes of preparing the *farina* for consumption, with the various economical uses to which the different portions of the sago palm are applied, at some length, and winds up with the rough estimate of an English acre yielding 8000 pounds of raw meal a year.—See vol i. page 383 to 393. We do not pride ourselves on our skill in botany, and submit quietly to be led in the term (metroxylon sagu) given to the palm tree, called *rumbiya* by the Malays of this part of the world, which produces the pith, afterwards manufactured into sago; though we are not obliged to confess that we are led blindly, inasmuch as the latest work we have had it in our power to consult calls sago the production of the *cycas*

revoluta, and the "Encyclopædia Britannica" has it the *cycas circinalis*, a genus of plants, however, classed by Linnæus first among the *palms*, and afterwards amongst the *ferns;* so far we may be allowed to admit that which we cannot confute; this knotty point settled, we may proceed to business, and, for the sake of perspicuity, will divide the subject in two parts, and speak first of the crude, then the refined state. *Its crude state.*—First,

Low marshy situations, shut out, but at no great distance from the sea, and well watered by fresh water, seem most productive. The soil in such situations, to the depth of several feet, is generally a flaccid mould, composed chiefly of decayed vegetable matter, and extremely pervious to water; below the above depth, a stratum of marine formation generally exists. According to Raffles, on Java, this tree is found only in a few low and marshy situations, and the preparation of sago "from the pith is not known to the inhabitants." Marsden says, that sago is but little used by the Sumatrans; and Crawfurd, as we have before stated, presumes that in this, or the western part of the Archipelago, the sago palm is an exotic. Our inquiries have been unavailing in the attempt to discover it as indigenous in our neighbourhood, and we feel confident that it does not exist in the native wild state to the eastward of Borneo.

The best sago produced in our vicinity is from the islands of Appong and Panjang, which form the east bank of Brewer's Straits, or properly Salat-Panjang; and next in quality is that from the rivers Mandha, Katuman, Goung, Egal, Plandok, and Anak Sirka, lying between the Campar and Indragiri rivers, on Sumatra, or Pulo Percha as it is called by the Malays. Of least value is the produce of the islands of Burn, Ungah, and Kundor, in the Straits of Dryon or Salat Duri. The sago palm is found in several other places, in small quantities, but seldom cut down by the lazy possessors of it, to whom it probably descended through a long line of equally sluggish ancestors, from some *Inchi* of *Zamandaulu*, who had better notions when he planted it.

The nature of the soil in the places we have mentioned is very similar, all of them deep bogs, next to impassable to one unaccustomed to such walking.

Cutting down and burning the jungle is all the preparation required previous to planting the palm, which is best done from the seed, a small black nut, about the size of a pullet's egg, at about five fathoms apart.

Plantations have been tried from the suckers, but the injury sustained by their roots in the separation from the parent stem, has invariably retarded their growth above a year.

From seven to ten years is the time it takes for the tree to bear fruit, when planted from the seed in the first instance; cutting down, for their pith, commences generally at about the age of six or seven years; after this period, the pith gradually loses its moisture, and is no longer fit for the purpose when the tree comes into bearing.

Sago is cultivated in large patches, divided into lots, the property of individuals, and as much as one man, his wife and family choose to look after; I say choose, because it is not as much as they *could*, if they *would* attend. One man, as above, can manage 100 fathoms square; upon this he plants 400 seeds, and subsists himself for the first six or seven years on his means, not unfrequently leaving the trees to take care of themselves, until he can commence cutting; from that day the supply is constant; each tree throws out from ten to twenty suckers, which increase so rapidly that the owner is obliged to thin them constantly; a good tree yields from forty to fifty tampins, and the worst ever cut down about twenty-five; this is on Appong. The tampin of Appong is to that of Mandha as four is to five; and is a rough measure made of the leaves of the sago tree, of a conical form, twenty to thirty inches long, with a base of about eight inches diameter: both ends of this are stuffed with the refuse pith, to prevent the escape of the *farina;* and the tampin of Appong holds, on an average, nineteen

pounds avoirdupois; thus seven tampins very nearly equal a picul of this place, or 133¼ lbs. avoirdupois.

It will be needless to speak of the sago of each place, differing but a little in quality, and in the measures they are sold by, as the acuteness of the Chinese brings them all to their level on arrival here. One remark on the stupidity of the cultivators may be noticed, viz.—one hundred tampins of Appong may always be purchased on the spot, cheap or dear at other places it matters not, for 6 1-4 reals, or Spanish dollars, 5.12, as a Spanish dollar or a real is the same thing with them, and both go alike for 246 doits or 82 cents of a Spanish dollar of Singapore: if the person in quest of sago takes doits, they must be of the small kind but thick. At Mandha, on the same principle, the same number of tampins may be had for Spanish dollars, 9.61. Now the Appong measure yields 14 piculs, 29 catties, and the Mendha 17 piculs, 86 catties; a difference against Appong, of Spanish dollars, 2.51, and all because they say it has been the *adat* or custom to sell it so!

One person is sufficient to clear the underwood away, as it grows up, in every lot of 100 fathoms square. The whole family are, however, fully required when at times they cut down for manufacture, which is always done on the spot where the tree is felled. They prepare the number of tampins, or measures, required for the reception of the sago, in the first instance, and put them out to dry: they then fell the tree, and split it in halves by means of wedges, build a temporary house over it, and dig out the pith with hoes made from the rind of the tree; this they carry up into the house, the floor of which is latticed so close, as just to allow the finer parts of the medulla to pass through, on being wetted with water and trodden by the feet; into this house the produce of the trees is brought, two or three at a time, and all the finer parts are carried down by the water into the trunks of the trees, three or four feet in diameter, which are cleanly hollowed out, and left below to receive it. In order that no waste may take place, they lead a mat, made also of

the leaves of the palm, from the floor of the work-shop down into the shells of the trees, and this carries the water without spilling any: they trample it until the water passes through clear of the farina, and then throw away the refuse, keeping sufficient merely to stuff the ends of the tampin. By the next day the medulla has settled in the trunks of the trees, leaving the water at the top; this is drawn off, and the sago flour thrown, in its wet state, into the tampin already prepared, and left to strain itself: some refuse pith is then put on the end before left open, the base of the cone, and the work is done. The shell of the tree is then cut up for firewood, or in slips, and thrown into the marsh to prevent the poor people going quite over head, in carrying down the sago to boats waiting for it. This is always their duty, for if the Malays, who come to purchase, could not get this included in their agreement, the chances are, they would go elsewhere in search of the sago. Sago once made is obliged to be kept wet, or it would spoil in a few days; again, kept constantly wet, the tampin leaves soon rot; cultivators cannot, therefore, keep a stock ready but at a greater risk than these savages choose to undergo. They have a method of frying the meal over the fire, called there *sagu randang*, which sells for a real, or 82 cents of a Spanish dollar, for sixteen of their gantongs are equal to twenty of Singapore, or one picul. This, however, will not keep long—as damp throws it all into a glutinous mass, and in a short time spoils it, and it may easily be supposed that their situations are not *very dry and airy!* At Appong, the sago is made by Orang Utan, or people of the woods, who speak a jargon of Malayan, are not Mohammedans, and eat the hogs, deer, &c. with which their island abounds; and the maritime Malays, who visit them for sago, are obliged to be always upon their guard, and not unfrequently wait two months for the cargo of a few hundred tampins; if they take money to purchase, they get it much quicker, but require additional caution in making advances. There are said to be about three hundred and fifty souls, and that the produce might be put

down at three thousand piculs a year. The most of these people are dependents of Siak and Campar; the chiefs of the former place exercising a system of extortion and rapine, enough to induce any other class of people less accustomed to desert the place. The cultivators in the other places are Malays, and much superior, though their exports are severally less, and trafficking with them is not so dangerous or uncertain.

Appong has three hundred and fifty souls employed, and could produce three thousand piculs; this would afford, under all the disadvantages at which they sell it, 1024 Spanish dollars per annum, a sum quite adequate to the demands for foreign luxuries of people who do not eat rice, and live upon the produce of their woods. The people of Siak were the chief importers of sago into Malacca, whence erroneously it got the name of Siak sago, described as the best by Crawfurd. Siak itself exports no sago.

Malays all agree that the cultivation of sago is the most profitable of agricultural pursuits, not yielding to even the cultivation of rice by sawurs, for once in bearing, the trees are *ad infinitum* equally profitable, and require little or no labour.

The miserable state of barbarism in which the cultivators of sago exist, puts all calculation at defiance; but we do not hesitate in saying, if any person would commence here—and there are many places peculiarly favourable to it, and of considerable extent—that the profits of an English acre, when the trees were once fit to cut, would amount, on a low estimate, to fifty pounds sterling per annum, after paying all expenses.

This, too, is a branch of agriculture that a European might engage in, without the certainty of being robbed, which pertains to the culture of spices, &c.

Gauthier or Linen Plaster.

℞.—Plaster of diapalma,
Plaster of simple diachylon, āā ℔j.
Plaster of burnt or brown ceruse, ℥viij.
Powdered orris root, ℥iss.

Liquefy the three plasters together, and then incorporate the powdered orris root. Plunge into it, while it is melted, a piece of linen one or two feet long, and four or six inches broad, agitating it with a spatula until it be well impregnated. Then elevate it by the corners, and draw it through two straight wooden rulers, held by another person, for the purpose of depriving it of the superfluous plaster and rendering it uniform. After it is partially hardened by exposure to the air, place it on a smooth stone (oiled), and roll it with a smooth billet of wood until it becomes uniform and polished on both sides.

The plasters of which the above is composed are directed, in the same work, to be made as follows :

Plaster of Diapalma—

℞.—Litharge,
Olive oil,
Lard, āā ℔iij.
Water, q. s.

Put these substances together in a copper vessel, over a fire sufficiently strong to occasion a moderate ebullition, stirring them constantly with a wooden spatula, for one or two hours, or until the mixture assumes a dirty white colour. Water must be added from time to time, to supply the waste of evaporation, and when it has acquired a moderate consistence, add,

Sulphate of zinc, ℥iv. dissolved in water, q. s.
White wax, ℥ix.

The vessel must be retained over the fire until the wax is well liquefied, and all the water is evaporated; the latter event is known by the plaster ceasing to bloat or swell. In

consequence of the absence of water, it requires great nicety in the management of the fire towards the close of the operation; for if the heat be too strong or too long continued, it speedily changes colour, and becomes gray.

This plaster is considered by the French as useful in the treatment of violent ulcers. It is sometimes made into the consistence of ointment by mixing with it one-fourth of its weight of olive oil, and is then called cerate of diapalma.

The Simple Diachylon of the French differs but little from that usually kept in our shops; the latter, therefore, will answer every purpose in the composition of the Gauthier plaster.

Burnt, or Brown Ceruse—

℞.—White ceruse, ℔j.
Olive oil, ℔ij.

Unite these bodies by a gentle heat, stirring them constantly, *without the addition of water.* When the ceruse is perfectly dissolved, liquefy in it

Yellow wax, ℥iv.

and form the whole into a plaster. The oil burns a little, and acquires a brown colour, from the absence of water.

The Gauthier plaster, or linen prepared from the above materials, resembles very much the celebrated Mahy's plaster, and has been successfully substituted for it by some of the practitioners of this place. E.

Selections from Faraday's Chemical Manipulation.

We commence in this number with a series of extracts from the above work, which is a treatise of more practical utility in its particular line than any heretofore published. Its value consists chiefly in this, that it enters into details which others have thought below their notice, and which students

have been obliged to find out for themselves. We select the chapter on Cleanliness, which is as important in the apothecary's shop as in the laboratory. The very minuteness and seeming insignificance of the particulars into which it enters should commend it to our notice. The maxims which should be instilled into boys from the moment they enter the shop should be cleanliness—order, neatness, cleanliness. These are the great secrets of success in the business—without them learning and talents will be of little profit, and with them the most moderate abilities are sure of prosperity.

Cleanliness and Cleansing.

Much as the chemist may soil his fingers during his experimental occupations, he will soon learn the great importance of cleanliness to the success of his experiments. The regular course of his operations causes many kinds of matter to pass in succession through his hands; and many of the substances which by mixture have exhibited the phenomena they were competent to occasion, and so far answered the purpose of the experiment, then become mere useless dirt. Their dismissal and entire removal when thus circumstanced, become necessary that they may not contaminate other bodies; and are as imperatively required, as was the care previously bestowed to prevent their contamination from extraneous matter.

It is this rapid change in the character and relation of the substances with which the chemist works, that makes a constant attention to cleanliness essentially necessary. The very bodies which at one moment are carefully retained in vessels that have previously been cleansed with the most scrupulous attention, become the next in the situation of so much dirt, from which the vessels must be cleansed as perfectly and carefully, before they can be fit for another experiment, as they were for the reception of the now rejected matter. The results of numerous experiments relative to testing bodies in solution by re-agents, are, in many cases,

dependent on the employing of clean vessels. For instance, a portion of water examined in glasses which have been carelessly washed, may occasion a slight precipitate with nitrate of silver or muriate of baryta, and thus seem to contain a sulphate or muriate, when the cause of the precipitate may be nothing more than portions of salt adhering to the vessels.

In the same manner the purity of an acid or a test is not unfrequently affected by the state of the bottle containing it, or by the dirty condition of glass rods dipped into it, or of the funnels through which it has been poured or filtered, or of the vessels used in its transference; and sometimes it is contaminated by laying the stopper of the bottle containing it in a dirty place. Nor is it only that kind of dirt or impurity which gives an evident tinge to what it adheres to that is to be avoided, but also numerous colourless substances, as salts, solutions, &c.; and in a word, any thing which differs from the principal substance itself, and is at the same time liable to be dissolved or mixed with it.

In consequence of these liabilities, and their interference with experiments, it should be established as a general rule in the laboratory, that no apparatus, nor any vessel, (except such as may be destined to a particular use, and is as convenient when with a little previously adhering matter as if it were clean), be put away in a dirty state. All vessels or instruments when resorted to should be found fit for the nicest experiment to which they are applicable. Glass rods or stirrers should be preserved in a clean place; glasses on a clean shelf; and stoppers when taken out of bottles, should be laid upon clean glass surfaces. These attentions and regulations will be found always useful, at times essential. They are generally more requisite and influential in minute chemistry, than in large experiments; and in trains of research, than in the processes of the manufacturer.

Cleansing of vessels.—Glasses. In by far the greatest number of cases glasses are dirtied by moist substances, as precipitates or solutions; it is then advantageous to cleanse

them immediately upon throwing out the contents, and before the dirt can dry or harden. Rinsing will usually remove the whole of the dirt; or if it adhere it is but slightly, and immediately gives way when touched by a wire with moist tow. If it should resist this application, a similar wire with wet tow, aided by a little of the wood or charcoal ashes which are always lying at the bottom of some of the furnaces, will generally remove every thing. Sand should not be used for these purposes, as it cuts and roughens the soft flint glass, of which vessels are made in England; and at the same time that it injures their transparency, it renders them improper for several particular experiments of precipitation. When by any of these methods the dirt has been removed, the glass is to be well rinsed in clean water, turned upside down for twelve hours on a side shelf or table to drain, and then wiped. The wiping should be performed with a cloth in each hand, not only because a cloth is more cleanly than the hand, but that if the glass should break the hand may be defended. The cloths should never be in a greasy, resinous, or pitchy state; but so clean that without communicating any thing, they will remove all substances that can be wiped off. Laboratory cloths when clean, should be used, first for wiping glass, then for wiping tables or dirty apparatus, and being once so used, should not be employed for clean glass again until they are washed. Especial care is required in wiping glasses that the inside be thoroughly cleansed in every part, for it is with that part of the vessel that tests and solutions come in contact.

If the glasses be greasy they should not be washed, but in the first place wiped with tow to remove as much as possible of the grease, and then a dry cloth should be used, until the glass appears clean. Its surface should afterwards be washed with a little strong solution of alkali, applied by means of a wire and tow; this removes the thin film of grease remaining after the wiping, and the glass may then be rinsed, drained, and wiped, as before directed. A duster should not be used at random for these greasy glasses, lest it

should the next moment be applied to a clean vessel and communicate impurities to it; but one should be kept apart and appropriated for these purposes.

If the glass be soiled by resin, turpentine, resinous varnishes, or similar bodies, it should in the first place be washed with a little strong solution of potash, those places where the resin adheres being rubbed by means of a wire and tow, until the alkali has softened the whole, and rendered it soluble in or movable by water. It is then to be washed, rinsed, and dried, as before. Or in place of alkali a little strong sulphuric acid may be used, and is sometimes even more advantageous: being poured into the glass or vessel, the latter should be inclined in various directions, so as to bring the acid into contact with all parts of the foul surface: it will become very black, and after a few minutes the resin, &c. will wash off, and the glass may be cleaned in the ordinary way.

Pitch and tar, when they adhere to glass, may in part be scraped off. A little strong sulphuric acid applied as above, will loosen and separate the remainder. Occasionally a little oil may be used; being rubbed on the soiled parts, it mixes with and softens these adhesive substances, so that they may be wiped off by tow, and then the glass is to be cleaned from the oil as before described.

Tubes are cleansed generally in the same manner as glasses. Wires with tow will be found very convenient in displacing solid and adhering dirt from their insides. They should be well rinsed twice or thrice, the tube being each time half filled with water, closed by the finger, and then well shaken. They may be turned upside down, and left inclining against each other in a corner to drain; after some hours they may either be wiped dry within by a cloth and stick, or what is perhaps more convenient, left with their mouths open to the air until the interior has become dry by evaporation, and then be wiped to remove any dust which may have entered. Tow is not a good substance for the removal of water from glass surfaces, and for tubes it is bet-

ter to use a long slip of cloth, two or three inches wide. Having introduced a few inches in length of this slip into the tube, the wire or stick is to be inserted, and the cloth thrust up to the extremity, so as to form an accumulation there; the rest of the tube will then be occupied by the wire or stick and a part of the slip of cloth. It will thus be found easy by a very little management, and a rotatory and longitudinal motion of the tube, to wipe every part of the inside clean and dry in an expeditious and perfect manner.

Long tubes open at both ends, which have become dusty, are easily wiped by pushing a loose pellet of cloth or tow up and down them by a long stick: or a piece of string, having a loop at the end into which some tow has been introduced, may be used to draw the tow through the tube, and thus to wipe it clean. This is a very useful mode of cleaning bent tubes open at both ends; the end of the string may be readily passed through them, by attaching a little piece of wire to it, as a weight. The piece of string must be longer than the tube to be wiped, and the portions of tow used at first, should be such as will easily pass the angles; they may be increased in size by the addition of more tow if necessary.

Evaporating basins are very easily washed. The soaking tub is useful for the softening and removing of most substances which are likely to accumulate in them. Grease, resin, and similar bodies, may be removed by tow and damp ashes, or soft sand, or otherwise by a little strong sulphuric acid. When all dirt is removed, the basins should be rinsed, turned upside down to drain, and then wiped. It is advisable to clean the stock of evaporating basins belonging to the laboratory once every two or three months, with a little strong solution of alkali, both inside and outside, rejecting at such times those which have become useless.

Flasks are not so easily cleansed as the vessels already mentioned, from the greater difficulty of access to the interior, but bent wires will overcome many obstacles. Florence flasks are frequently oily when obtained from the

Italian or wine warehouses. They may be readily cleansed by putting a little strong nitric acid into each, and heating it over a lamp or sand-bath, after which every thing will wash out with water. Strong sulphuric acid may be used for the same purpose, being brought into contact with every part of the glass, without requiring the application of heat. Either acid is better than the solution of alkali. If metallic matter adhere to the inside, a little nitro-muriatic acid introduced, and heated on the place, seldom fails of separating and removing the substance. When the impurity is loose or separable by water, the flasks should be well rinsed and inverted on a filtering-stand or retort shelf, left to drain for half an hour, then well rinsed with distilled water, and again placed to drain.

When the impurity within flasks, globes, or similar vessels, adheres mechanically, and is not soluble in water, it may frequently be effectually loosened and removed, by introducing some coarse brown paper torn into fragments about an inch square, with water enough to half fill the vessel, and agitating the whole well. The pieces of paper will rub or break off dirt that has resisted the action of water alone, and most sediments or deposits may be thus removed. The addition of a few wood-ashes increase the effect.

Upon wiping the exterior of globular vessels, those which are thin, as Florence flasks, require care, lest they be crushed to pieces between the hands. It may be necessary to dry the interior of some of them, but others will not need it. When they are to be dried, they may be left on the retort shelf in the cupboard, or on the filtering-stand, with the mouth downwards, until the water within has evaporated; but as this will require some days or weeks, a more rapid method may occasionally be adopted. This is to warm the flask, so as to convert the water within into vapour, and then by introducing one end of a piece of glass tube, whilst the other is held by the hand against the nozzle of a pair of bellows, to blow out the moist air, and replace it by that which is dry. If the first warming be insufficient to convert

all the water into vapour, the flask may be heated a second time; or if the flask be thick, and retain its temperature for some minutes, merely persisting in blowing air through, will gradually evaporate and remove the water from within.

Instead of using the bellows, the mouth will answer every purpose; for if, when the flask is hot, the external end of the tube be put between the lips, it will be easy to throw air in from the lungs, which, though it contain moisture, is much drier than that in the flask. When the appearance of liquid within no longer exists, the moist air last introduced from the lungs is easily removed by drawing air out of the flask, through the tube, into the mouth; other portions then enter to replace it, and the vessel is left filled with an atmosphere of ordinary dryness.

Six or eight Florence and other flasks should be kept ready for use on the filtering-stand; the mouths of the rest should be covered up with paper, to keep the dust out, and be put aside until wanted. In thus guarding the mouth of a flask, retort, tube, or similarly formed apparatus, it is merely necessary to roll a slip of paper round the end, so that it shall project sufficiently beyond the edge, and then to fold or double this projecting part down, in such a manner as to close the mouth, and at the same time prevent the slip from unrolling.

Bottles. The bottles of the laboratory require constant attention and cleansing. They are liable to accidents and uses of all kinds, and are soiled by every species of matter in turn. Now and then the stoppers of bottles become fixed, in which case means of loosening them, successively increasing in power (but also unfortunately in danger), must be resorted to, until the stopper is removed, or giving way, is destroyed. One of the simplest methods when the unaided hands fail, is to tap the stopper alternately on opposite sides, with a piece of wood, as the handle of a bradawl or a chissel, the other part of the tool being held loosely in one hand, whilst the bottle is retained lightly at its lower part in the other. The light alternate concussions on the opposite

sides of the stopper, are often sufficient to destroy the adhesion between it and the bottle. This is indicated by the sound; for so long as the adhesion remains perfect, the noise made by the tap is as if the bottle and stopper were but one piece of matter; but the moment the stopper is loosened, however slightly, the character of the sound changes, becoming somewhat flatter and heavier, and then a few more taps complete the operation, and the stopper gives way to the hand. Before thus endeavouring to loosen the stopper, the thickness of the neck by which its upper and lower parts are connected should be observed: if that be very small, the force must be carefully applied; if strong, a little more liberty may be taken with it. If the stopper does not soon give way, this means alone will not be sufficient for its removal.

Another method of removing a bottle-stopper is to insert its head into a chink, and then endeavouring to turn the bottle with the hands. This kind of force is similar to that exerted by the hand upon the stopper, but is more powerful; and if the neck of the stopper break, the hand is out of the way of danger. An upright board, such an one as supports the ends of a set of shelves, should be selected in a convenient situation in the laboratory, and a vertical slit cut through it, about a foot in length, an inch in width above, but gradually decreasing in size, so as to be about the third of an inch at the bottom. The top of the hole may be about the height of the breast. This aperture will, in one part or another, receive and retain the head of almost any stopper, and prevent it turning with the bottle. Then by wrapping a cloth about the bottle and grasping it in both hands, the attempt to turn it round so as to move the stopper may be made, with any degree of force which it may be thought safe to exert. If the force be such as to occasion fracture, it will generally occur at the neck of the stopper, twisting the head from the plug. It is only when the bottle is wide-mouthed, the stopper consequently having great surface of adhesion, and the neck of the stopper is also very thick,

that there is any risk of the bottle breaking in the hand. But the force employed should never be carried so far as to cause fracture any where, but the attempt, if unavailing with the application of a moderate degree, should be desisted.

Another and a very successful method of removing a stopper is, to turn the bottle round, when held horizontally over the small flame of a spirit-lamp or candle, applied to the neck. The heat should be applied only to the part round the plug of the stopper, and in a few moments, when that has become warm, the stopper should be tapped with the piece of wood as before. The application of the heat expands the neck of the bottle, and actually rendering it larger, permits the removal of the stopper to be effected by a force previously quite insufficient. As soon as the stopper moves by tapping, it is to be taken out, and must not be replaced until the glass is cold. The application of heat in this manner must be short, and the operation altogether to be successful must be a quick one; for it is obvious that the effect depends upon the *difference* of temperature between the stopper and the neck, and if the former become heated as well as the latter, no good effect can be expected, and the bottle is endangered by the application of heat to no good purpose.

If the contents of the bottle are fluid, it should be held so inclined that they may not become heated; if they are volatile, this method should be tried very carefully, lest the vapour formed within should burst the bottle. The application of heat in this way is seldom successful, unless immediately so; and there is always some risk of cracking the neck of the bottle.

It is often advantageous to put a little olive oil round the edge of the stopper at its insertion, allowing it to soak in for a day or two. If this be done before the heat be applied, it frequently penetrates with increased facility; by oil, heat, and tapping, very obstinate stoppers may be removed. When a stopper has been fixed by a crystallization from solution,

water will sometimes set it free, and it is more advantageous in such cases than oil, because it dissolves the cement. When the cementing matter is a metallic oxide or a sub-salt, a little muriatic acid may be useful, if there be no objection to its application arising from the nature of the substance within.

The preceding are all quick operations, and one or other of them will generally loosen a tight stopper, and save the bottle with its stopper and the contents. If they fail, the following method may be tried, which is particularly successful in cases where stoppers are forced inwards by atmospheric pressure, in consequence of internal absorption; the preceding methods often make such cases worse. A piece of strong twine is to be doubled, and a knot tied so as to form a loop of about four inches in length. The knot is to be brought close to the neck of the stopper, the two ends passed round, so as to meet on the opposite side, and tied there tightly, so as to fasten the string securely round the neck. The two strings are then to be tied together, so as to form a loop on that side the stopper equal in length to the first loop, or about four inches. These loops now serve as handles by which to pull at the stopper, and being on opposite sides, permit the force to be applied so as to draw the stopper directly forward out of the neck of the bottle. For this purpose they are to be passed over a fixed bar (if horizontal so much the more convenient), and are to be placed about 2½ or 3 inches apart on the bar, that by directing the pull on the bottle a little on one side or the other, the strain upon the stopper may be equal or nearly so on the two sides. A cloth is now to be wrapped about the bottle, the hand being applied round the neck, and the bottle is to be pulled steadily. During the endeavour to separate it from the stopper, the latter must be struck gently on each side with the piece of wood, as before directed. The force with which the bottle is pulled must be increased until the stopper either gives way, or the power has been increased unavailingly to such a degree as to excite fear that the bottle

itself may break in the effort. But generally, long before this fear need be entertained, the stopper will leave its place, and the operation will consequently have succeeded. It is necessary to have a care that as the stopper leaves the neck and falls down, suspended only by the string, it shall not swing against any thing so hard as to occasion its fracture; this is easily done by putting a cloth or duster to receive it.

When stoppers become fixed in the necks of jars, they are generally removed with great facility by hitting them from beneath with the end of a stick, which tends directly to force them out of their places; few stoppers will resist this advantageous application of mechanical power. The stick should be a solid and rather heavy one, but not so hard as to endanger the glass. The end of the handle of a hammer answers very well for the purpose, the head of the hammer adding to the momentum and steadiness of the blow.

If the stopper will not give way to any of these methods, then all that can be done is to remove it piecemeal. Large stoppers are often made hollow to diminish their weight; the heads of these may be broken off, when their plugs are easily penetrated by a pointed file, and thus may be separated without loss of the bottle. But if the stoppers are solid, it is only by grinding that they can be removed; this is the work of the glass cutter, and the value of the bottle is seldom equal to the expense and risk. The bottles of which the stoppers have been successfully broken out, must be refitted with others from the stopper drawer.

All the agents and methods for cleaning glass already referred to, are required occasionally for the cleaning of bottles. The stoppers should be cleaned at the same time, and when acids or alkalies are applied to the bottles, a little should be allowed to flow about the stoppers when in their places, and the latter then worked in the neck for the purpose of rubbing off the impurity, and bringing it more freely into contact with the dissolving or detaching agent. When all foulness is dissolved or washed away, the bottles should be drained, rinsed in distilled water, drained again,

and then wiped; and if necessary dried within, by warming them and blowing air through them. This must be done with more caution than is necessary for flasks, because of the greater irregularity in thickness and form of these vessels. Finally, the stoppers are to be replaced, a little tallow or yellow wax being put round them, in the manner already described.

Remarks upon Reagents. By J. J. Virey, M.D.

To our junior pharmaceutists, who are engaged in chemical researches, we would recommend the perusal of the following remarks upon reagents, translated from Virey's Traité de Pharmacie, Vol. I. p. 14.

Reagents, properly speaking, are,

1. THE PURE ALKALIES.—Potassa, lithia, soda and ammonia decompose those salts which have earthy and metallic bases. A watery solution of baryta detects sulphuric acid at all times, and forms with it an insoluble salt. Strontia acts in the same manner as the alkalies do.

Caustic potassa shows the presence of earths in the milk of sulphur and the mineral acids; of colophony in the resins of guaiacum and jalap; and of alumine in magnesia. It decomposes the protochloride of mercury, and tests the existence of sulphate of magnesia, alumine, and metallic salts in mineral waters.

Ammonia forms a blue solution with copper, which may be employed to detect arsenic in tin, in the muriate of baryta, cinnabar, and corrosive sublimate. Copper may always be discovered by this alkali when it is contained in food or drinks, the juice of liquorice, vinegar, and other acids; as well as in alum, the hydrochlorate of ammonia, silver and the fused nitrate of silver.

It enables us to ascertain the existence of tin in gold leaf; of the oxide of iron in the sulphates of zinc, potassa, soda,

muriate of baryta, acetate of potassa, super-tartrate of potassa, alcohol, and the tartrate of potassa and antimony. By means of *ammonia* we may also recognise alum in wine, alumine in magnesia, the oxides of iron and zinc in sulphate of copper, and the carbonates of lime, the sulphates and hydro-chlorates of magnesia, of alumine, or those with metallic bases, in mineral waters. With magnesia, however, it forms triple salts, which diminishes, in this case, its value as a reagent.

2. Earths.—*Lime* and *magnesia* detect carbonic acid. *Lime water* discovers alum in wines, carbonic acid in caustic potassa and alum, sulphate of iron, the alkaline and earthy carbonates, sulphuric, phosphoric, oxalic, and carbonic acids in mineral waters. It forms a yellow brickdust precipitate with the deuto-chloride of mercury or corrosive sublimate.

3. Acids.—The *sulphuric* decomposes the neutral salts by displacing their acids or bases; detects the presence of lead in wines and vinegars, in tin, mercury, and the white oxide of zinc; lime in the precipitated white oxide of mercury; the calcareous carbonates and sulphates in magnesia and verdigris*; and tests the purity of magnesia or lime calcined. In the analysis of waters, this acid shows the existence of the alkaline and earthy carbonates, and of baryta.

The *nitric* disengages the tartaric and phosphoric acids from their bases, decomposes sulphuretted hydrogen gas in mineral waters, precipitating its sulphur; separates the ashes of bones mixed with flour, copper and lead contained in aliments, and copper in gold leaf; discovers the calcareous sulphates and carbonates, and the sulphate of baryta in white lead; proves the presence of silica or plaster in the proto-chloride of mercury, of tin in mercury, the earths or carbonic acid in the caustic alkalies, and of sulphate of lime in magnesia. This acid also tests the purity of tartrate of

---

* Lead in acetic ether.

potassa and soda, and the acetate of potassa, and shows at all times when sulphur and ammonia are present.

The *hydrochloric* decomposes sulphuretted hydrogen gas, detects lead in wines, enables us to distinguish silver from tin in leaves, and discover arsenic in tin. It also recognizes lead in the acetates (more especially in the acetate of potassa of commerce, made by the double decomposition of acetate of lead and sulphate of potassa).

The *nitro-muriatic* or *nitro-hydrochloric* (aqua regia) detects the existence of lead.

The *sulphurous* and *nitrous acids* disengage sulphuretted hydrogen, and precipitate its sulphur.

The *phosphoric* discovers lime, and also separates the oxides of lead from many salts.

The *oxalic* precipitates lime from calcareous salts in wines, supertartrate of potassa, oxide of zinc, mineral waters, &c. The oxalate of ammonia, or the super-oxalate of potassa (salt of sorrel), is very generally employed to effect the double decomposition of the salts of lime.

Arsenic acid seizes upon sulphur, and forms a sulphuret in sulphurous waters.

Chloric discovers the presence of sulphuretted hydrogen and the hydriodates.

Iodic (dissolved in alcohol) detects at all times the existence of starch, and at once changes it to a blue colour.

Boric acid. Arsenic, which has been precipitated by lime water from its solution, may be afterwards reduced by being treated with charcoal and boric acid.

Tartaric discovers potash united to the sulphuric acid, and to the carbonate of soda.

The *carbonic* precipitates lime pure, &c.

The *acetic* shows the presence of lime in flours, and in the white oxides of lead; separates copper from gold-leaf, white lead from the sulphates of lime or baryta, lead from tin, diaphoretic antimony from the white oxide of zinc, lead and its oxides from those of mercury (such as the white and red precipitates) and cinnabar. Discovers lime in the

white precipitate or protochloride of mercury; tries the purity of minium, verdigris, &c.

Citric and *malic acids*, &c. are used in the analysis of vegetables.

4. NEUTRAL SALTS WITH ALKALINE AND EARTHY BASES.—*Sulphate of lime*, in solution, discovers oxalic acid in the salt of amber and other liquors*.

The *alkaline sulphates* form white precipitates with the solutions of lead.

Nitrate of potassa reveals manganese, iron, and arsenic in sulphur, and decomposes crude antimony by the aid of heat.

Nitrate of baryta separates the sulphuric acid from sulphuric ether.

Dry muriate or *hydrochlorate* of *ammonia* detects potassa or lime in sugar, by giving it an ammoniacal odour.

Muriate of baryta shows the presence of sulphuric acid in vinegars; or the hydrochloric, nitric, phosphoric, and tartaric acids in sulphuric ether and Hoffman's liquor; the sulphates in the muriates of soda or ammonia, in the nitrates, in the sub-borate of soda, in mineral waters, sugar of milk, and the succinated liquor of hartshorn.

Muriate of lime recognizes phosphoric and oxalic acids every where; phosphate and sulphate of soda and carbonate of soda in waters; carbonic acid in caustic ammonia.

Acetate of baryta discovers alum in wine, and sulphuric acid in vinegars, salts, and every other substance that contains it.

Carbonate of potassa enables us to recognize alum in aliments and drinks, lime in beer, and tartaric acid in vinegar, and in the salt of amber or succinic acid: to test lime-water, and precipitate the metallic oxides from the sulphates; earths from the muriates; iron, copper, and earths from all the salts with alkaline bases: to separate the acids from

---

* We would suggest that the sulphate is very slightly soluble in water, and not likely to be employed in this way as a test.—ED.

ethers and Hoffman's liquor, as well as water from alcohol, by which its strength is increased. Finally, it discovers muriate of ammonia in succinic acid.

Carbonate of soda decomposes the earthy and metallic salts in mineral waters.

Hydrocyanate or *prussiate of potassa* or *lime* precipitates iron of a blue colour from its solutions. The prussiate of potassa detects copper in aliments, iron in oxide of zinc (fleurs), mineral waters, caustic potassa, and acids.

Sub-borate of soda or *borax* proves the presence of cobalt in colours, by employing it as a reducing flux.

5. SALTS WITH METALLIC BASES.—*Sulphate of silver*, in solution, indicates the muriates in the salts, in lemon-juice, in waters, and discovers arsenic in sulphur.

Sulphates of iron and *of copper* act on gaseous sulphuretted hydrogen.

Recent sulphate of iron (green, protosulphate, or at the *minimum* of oxidation) gives a rust (oxide of iron at the *maximum*) by oxygenated waters, and at all times forms a black precipitate with tannin and gallic acid. Sulphate of copper discovers arsenic and corrosive sublimate in aliments, and sulphur in sulphurous waters.

Nitrate of silver precipitates animal mucus, exposes the presence of sulphur and sulphuric acid in wines; detects the hydrochloric acid in vinegars, nitric acid, the alkalies (after their saturation), nitrate and acetate of potassa, the magnesia salts, carbonate of soda, tartrate of potassa or soda, and sugar of milk; it recognizes phosphorus by a black precipitate of phosphuret of silver, and shows the existence of the muriates and sulphates in distilled waters; and is itself blackened by the hydrosulphurets.

Nitrate of mercury precipitates also mucilages and other vegetable principles, discovers alum in water, tests lime-water, reveals the sulphates, muriates, and hydrosulphurets in waters, as well as the carbonates of soda, lime and magnesia, and always the sulphuric and hydrochloric acids.

Nitrate of lead betrays the presence of sulphuric acid in

combination with tartaric acid, salt of amber, tartrate of potassa and soda, supertartrate of potassa, and tartar emetic; and uniformly forms a precipitate with the hydrochloric acid.

Hydrochlorate or *chloride of arsenic* or *of antimony* and *platina*, demonstrates the existence of sulphur in mineral waters. By mixing the *chloride of platina* with salts having potassa or soda for the base, a change of colour results; with those of potassa a yellow precipitate takes place, while with those of soda the liquor only is tinged yellow; and a reddish yellow precipitate follows the addition of ammonia or its salts.

Deutochloride of mercury (corrosive sublimate) precipitates animal albumen; recognizes, in waters, the carbonates of soda and lime, and is precipitated by the hydrosulphurets, like all the metallic salts.

Acetate and *liquid superacetate of lead* (extract of lead) precipitate animal mucus, and reveal sulphuric acid in vinegar and other liquors, in nitric and tartaric acids, and neutral salts; discover alum in tartar, and the sulphate in tartrate of soda; the alkalies, earths, sulphates and muriates in waters, as well as sulphuretted hydrogen, and especially sulphur.

6. The pure metals (or reguli).—*Silver* discovers sulphuretted hydrogen (hydrosulphuric acid) in wines impregnated with sulphur, and in albumen, by blackening them.

Mercury, liquid or *flowing*, detects the same substances as the former in mineral waters, and corrosive sublimate in aliments.

Polished copper also shows the presence of corrosive sublimate.

Polished iron precipitates copper found in wines and aliments, and enables us to ascertain the presence of the same substance in iron filings, extract of lead, lunar caustic, neutral salts, tartar, tartrate of potassa, the sulphates of iron and zinc, and the muriate of baryta; also in tamarinds, liquorice-juice, extracts, &c.

Polished zinc discloses lead in vinegar, tin in tartar emetic, and sulphur in arsenic.

7. THE METALLIC OXIDES seize upon all the hydrosulphurets, or decompose them, and unite with the sulphur. The oxide of copper, dissolved in ammonia (ammoniuret of copper), manifests the existence of arsenic in tin and corrosive sublimate, and the oxide of antimony in aliments.

8. THE SULPHURETS, CARBURETS, SOAPS, &c.—The ***hydrosulphate of ammonia*** detects the metals:—lead in vinegar, mineral waters, and muriate of baryta; arsenic in food; precipitating them of a black colour. The ***hydrosulphates***, the ***probatory liquor of Hahnemann***** detect lead in wine, vinegar, beer, aliments, colours, acetic ether, and in acetate of potash, prepared from the decomposition of acetate of lead; also antimony in wine, copper in alcohol, and mercury in the muriate of soda; tartrate of potassa in diaphoretic antimony and the white precipitate of mercury; discover arsenic in the muriate of baryta, cinnabar and corrosive sublimate, as well as red lead in vermilion. They also show the quantity of antimony contained in tartar emetic.

All the hydro-sulphates precipitate or reveal most of the white metals, as lead, mercury, bismuth, silver, &c. The ***black flux*** reduces the oxides of lead, or antimony when found in aliments, and tests the purity of red and white lead and other oxides.

Alcoholic solution of soap may be used to ascertain the presence of free acids, carbonic acid, salts of metallic or earthy bases in waters. It also announces the existence of sulphate of lime in *hard* (*crues*) waters, as well as salts with metallic bases.

9. ALCOHOLS AND ETHERS.—***Alcohol*** precipitates from

---

* This is prepared with the sulphuret of lime, and tartaric acid, of each ℥iv.; distilled water, lb. ij.—mix in a covered vessel. Decant the liquor from the deposit, and add tartaric acid, ℥j. See Pharmacop. Batav. 1805, in 4to.

Another hydrosulphate is that of arsenic made with orpiment, ℥ij.; pure or quick lime, ℥iss.—Boil in distilled water, ℥xij. Filter. It precipitates lead of a black colour.

their aqueous solutions the neutral salts which it cannot dissolve, and accelerates their crystallization. It separates tartaric acid from vinegar, phosphate and sulphate of lime from phosphoric acid, sulphate of potassa from sulphuric, tartar from succinic, the sulphates from waters, resins from assa fœtida, black pitch from asphaltum, essence of turpentine from oil of petroleum, the volatile from the fixed oils (except ol. ricini which it dissolves), colophony from resin of tamac; tests caustic and carbonated ammonia, salts, and spirit of amber, &c.

Sulphuric ether. The nitric, muriatic, and acetic ethers readily undergo decomposition, and their acids separate; they are not therefore as perfect as the sulphuric or phosphoric of M. Boullay. Sulphuric ether separates the fixed oils from balsam of copaiba (nevertheless these oils are only partially soluble in this fluid), spermaceti, the grease of fixed oils, or the butter of cocoa from wax; but alcohol is a preferable reagent in these cases.

10. WATERS AND AQUEOUS SOLUTIONS.—*Distilled water* answers the purpose of washing substances; it separates the oxide of bismuth from nitric acid, wine or tin; discovers alcohol it the volatile oils and ethers; tests the protochloride or butter of antimony, the acetate of lead; and precipitates bismuth from the white oxide of mercury, tin, &c.

Tincture of nut galls, aqueous or alcoholic, detects iron in sulphuric acid and alum; or the ammoniacal salts, muriate of baryta, acetate of potassa, sulphates of potassa, soda, or zinc, in the white oxide of zinc, hydrochloric acid, mineral waters, &c. and the precipitate is at all times either black or violet. It also precipitates all the substances in which azote predominates.

Tincture of tan precipitates albumen and gelatine, iron and the metallic oxides; enables us to test tartar emetic, cinchona and other vegetable decoctions.

Gelatine in solution discovers the presence of tannin and precipitates it.

B. E.

Translation of the Preface to the Codex Medicamentarius.

In publishing the following translation of the preface to the French Pharmacopœia, we are influenced by the wish to make more generally known in this country the truly wise principles upon which that work was planned, and the zeal, industry, and scrupulous accuracy of research by which it was brought to a successful completion. The profession of pharmacy has reason to be proud both of the confidence in its members which an invitation to share in the work implied, and of the subsequent proofs of diligence and skill by which this confidence was justified. As we are prone to imitate what we admire, perhaps the example which is here afforded may lead to a still happier result than the mere excitation of a transient interest.—*Ed.*

PREFACE.

A long time had elapsed since any copies of the ancient *Codex* were to be found in the shops, the progress of chemistry had changed and remodelled the nomenclature of that science, the discovery of powerful and efficient medicines had augmented the resources of the healing art; by every consideration, therefore, the publication of a new dispensatory was rendered indispensable: but it was necessary that it should be presented to the public, loaded, on the one hand, with a much smaller number of compounded medicines, richer, on the other, in simple preparations executed according to processes more correctly and precisely described.

In compliance with the repeated orders of the minister of the interior, the Faculty of Medicine of Paris, with the design of executing this work, chose from among its own professors, *MM. Le Roux* its dean, *Vauquelin, Deyeux, De Jussieu, Richard, Percy,* and *Hallé;* and requested at the same time the concurrence of the School of Pharmacy, which appointed three of its professors, *MM. Henry, Vallée* and *Bouillon-Lagrange.* The members of this commission had

met together, and devoted themselves to the undertaking, when they had the misfortune to lose one of their fellow labourers, *M. Vallée*, whose place however the School of Pharmacy supplied by *M. Cheradame*, its treasurer and oldest member.

Each individual contributed to the execution of the work, not only by giving his opinion at the meeting of the commissioners, but also by private labours and experiments.

M. Deyeux had already prepared a first sketch of the new formulary ; and the different sections and chapters of his essay were the first subjects submitted to the examination of the commissioners, at their meetings, which took place twice a week.

MM. Henry, *Vauquelin*, *Valleé*, and several others, afterwards made a great number of experiments, with the object, in some instances, of more thoroughly investigating the nature of the principal medicinal substances ; in others, of establishing the best mode of combining them, and of executing the most essential prescriptions. All the experiments to which we have referred, without naming the author, were performed by *M. Henry*.

MM. De Jussieu, *Richard*, *Vauquelin* and *Henry* undertook the catalogue of the materia medica.

Many others among the physicians and pharmaceutists of Paris also contributed to the success of the work. We ought to mention among others, *MM. Boudet*, *Guilbert*, *Duchâtelle*, and *Barruel*. We drew much from the collection known at first under the title of *Bulletin de Pharmacie*, afterwards designated by that of *Journal de Pharmacie et des Sciences Accessoires*. Of all the works which it was in our power to consult with advantage, certainly no one is to be preferred to this valuable compilation. We are indebted to professor *Chaussier* for important facts derived as well from his conversation as from his writings ; nor do we know to what fatality it is owing that he was not directly associated in our labours. We moreover received many useful hints from the writings of *Baumé*, of *Parmentier*, of *MM. Planche*,

Boulay, *Robiquet*, *Cadet*, *Pelletier*, *Virey*, *Swediaur*, and of several others. Hints were in like manner derived from the latest foreign Pharmacopœias: such as those of Sweden, Berlin, Holland, St Petersburgh, London, Edinburgh, &c., and especially from *M. Niemann's* additions to the Batavian Pharmacopœia, forming in themselves a kind of universal Pharmacopœia, which, though certainly not exempt from error, is nevertheless highly useful; not only from the abundance of its matter, but also in consequence of the analyses of medicines which it contains, and the judicious and important remarks of its learned author.

The final arrangement of the work, and its translation into the Latin language were confided to professor *Hallé*, who sought the aid of *MM. De Jussieu*, *Richard*, and several others.

When the work, accomplished as well by the individual as by the common labours of the commissioners, had been read over again, examined, and corrected in the general meetings, and was thus completely finished, it was directed to be sent to the press by the minister of the interior, who decided, with the approbation of his majesty, that it should receive the title of "*Codex Medicamentarius, sive Pharmacopœia Gallica.*" The printing of this edition was trusted to *M. Hacquart*. As the proofs came out of his hands, they were anew submitted to the examination of the commission; and it was only after its members were satisfied of their entire correctness, that they were finally delivered to the press.

As the essential object of the new *Codex* is to present to the apothecaries a uniform method for the preparation of medicines, by means of which they may be found every where and at all times absolutely the same, it was necessary, in the arrangement of the work, to adopt a method borrowed from the nature of the pharmaceutic operations themselves. On this principle we have divided the book into ten sections, of which the following are the titles.

I. Preliminary preparation of simple drugs, and pharmaceutic precautions.

II. Medicines derived from simple substances with the least possible alteration of their elements.

III. Medicines obtained from simple substances submitted to fermentation.

IV. Medicines obtained by the distillation of simple substances.

V. Solution of medicines in different liquids.

VI. Matters extracted from the different solutions inspissated.

VII. Medicines obtained from bodies by means of chemical analysis.

VIII. Medicines prepared by synthesis; i. e. formed of elements combined by chemical operations.

IX. Medicines formed solely by the mixture of simple substances, and designed particularly for internal use.

X. Medicines which, from their composition or their form, are designed especially for external use.

Under these titles we have arranged the various formulæ for the preparation of medicines. The formulary is preceded by a catalogue of the materia medica, in which the substances are disposed according to their origin from the mineral, vegetable, or animal kingdom.

In this catalogue, independently of the botanical, zoological, and mineralogical characters, which we have only briefly indicated, we have, as far as we were able, added those which may serve as tests of the quality of the different substances, whenever it is possible to be mistaken, or to be deceived in this respect.

When occupied with this part of our work, we hesitated whether to confine ourselves to the medicines which are at present adopted, and in daily use, or to introduce also into the collection a certain number of substances which, though formerly employed, are now forgotten or despised. Having examined the subject with attention, we came to the conclusion, that it would not be without advantage to those among us who make a particular study of the ancient writings, or feel an interest in the practices of foreign and distant nations, to find in our catalogue such a list and com-

pared nomenclature as might enable them to understand what is doing, or has been done, in times and places so different from ours. Besides, have we not numerous examples of medicines, which, having fallen into contempt and total disuse, from their supposed inefficiency or from apprehension of their injurious operation, have, in our days, been again brought forward and received into favour? Nor is it less advantageous to know the names of most of those vegetables, which, in case of necessity, may supply the place of such as are in common use. It has also been thought proper to give a place to certain substances, whose products are concerned solely in domestic economy, or in the operations of chemistry. We have in general preferred superabundance to deficiency.

In constructing the formulæ, we thought that our first care should be to leave nothing uncertain or equivocal, either in the mode of preparing the simple substances which nature presents to us, or in the production of those which result from pharmaceutic operations, or, finally, in the method of forming those compositions in which many substances are united, the mixture of which demands a precise order, and special precautions.

Among these different preparations, there are some which should always be kept ready made in the shops; they are called *officinal*. There are others which should be formed extemporaneously, according to the direction of the physician; these are denominated *magistral*. As to the latter, though the physician most commonly arranges their constituents according to the indications which each is calculated to answer, the apothecary, in executing the prescription, should not usually confine himself to this order; he should mix the substances conformably to the known laws of the chemical actions by which their union is to be effected. It is in accordance with this view that we have introduced some examples of the *magistral formulæ*, not for the instruction of the physician, but in order to present to the apothecary illustrations of the care which he should exercise, and the method which he should pursue, when called

upon to execute analogous prescriptions. Almost all the watery solutions are of this character; and under this title, therefore, we have sought to unite most of the varieties which they can afford, either in the order of their mixture, or the mode of preparing them.

Of the *officinal* preparations, some are simple, others composed of several medicines. In the sections to which they belong, we have generally arranged them in separate articles. Among the compounded preparations we have preserved only such as are every day demanded of the apothecaries by the public, and frequently by the physicians themselves. For though, at the first glance, it might appear to us that many of these prescriptions ought to be omitted, and their place in the Dispensatory supplied by more simple formulæ, we thought, nevertheless, that it did not become us thus to pronounce a kind of interdict against those which are still in daily use, and are even frequently prescribed by the masters of the art.

We have, therefore, retained some of them, but have restricted ourselves to a small number. Nor did we think that we ought lightly and arbitrarily to alter the formulæ, except in such points as concerned the perfection of the pharmaceutic processes. In fact, it seemed to us by no means proper to furnish any individual with a remedy entirely different from that which he might expect to receive. We know that the authors of the foreign Pharmacopœias do not agree with us on this point: but we thought it our duty to retain, without alteration, the modes of forming those remedies which are most employed by the physicians, and most extensively used by the public.

Nevertheless, while we thus yielded to usage, we felt desirous to simplify these formulæ, and have, therefore, been careful, however compound they might be, to cause those substances to be distinguished in their composition to which they owe their chief virtue. This we have accomplished, either by pointing out the substances in the title itself, or by marking them in the formulæ with a particular character, or by means of a special note placed at the end of the

prescription. Besides, we have in every instance designated the proportion which they bear to the whole mass of the medicine, so that any one may at pleasure reduce these formulæ to the simplest terms, without changing their real properties. Thus in offering the confused mixtures of drugs which constitute the most celebrated electuaries, such as the *dioscorium* and the *theriac*, the care which we have taken to arrange in classes the crowd of substances which enter into their composition, and to calculate the whole amount of these substances in each class respectively, gives rise to a kind of medical analysis of the preparations. Besides, we have annexed to the *theriac*, the most ancient of all, a chemical analysis of this singular composition, made with much care by M. *Guilbert*. And, in fact, when we have under consideration those remedies which have been employed with advantage by the celebrated men who have preceded us, and which are still usefully employed in our own times, is it not better to endeavour to appreciate their true value, than to reject them with contempt?

Independently of those preparations which have been so long registered in our formularies, and have not yet disappeared from practice, we have borrowed a very few others from the foreign pharmacopœias. We also thought that it was proper to make known to the public certain secret remedies generally used, and habitually exposed for sale in the shops, whenever we could obtain direct and satisfactory assurance of their composition, or ascertain it by means of analysis. This is the only mode of removing the danger which is always attached to the inconsiderate use of every remedy, the nature and value of which are equally uncertain.

Were not necessity, usage, habit, endued with the force of law, the best plan would certainly be to erase from our collections the greater number of compounded remedies; for it would accord much better with the interest of the art, and with that of the sick, to combine the ingredients in such manner as the circumstances of each particular case might

require, and in such proportions as might be determined by the occasion, as well as by the constitution and particular situation of those to whose convenience the remedies should be especially adapted.

We thought that our most essential object should be to secure the purity and perfection of the simple medicines, particularly of those which are the products of pharmaceutic operations; and to determine with accuracy the proportion of the elements which concur in their formation. It is to this end, therefore, above all, that our efforts have been directed. It is indeed by this alone that the virtue and efficacy of these medicines are insured; and it is on this that the quality of the compositions into which they enter must depend. The progress of chemistry has rendered such accuracy obligatory upon us, and we have, therefore, in the detail of the operations, feared much less the accusation of prolixity, than that of negligence. We ourselves made, with this design, numerous experiments, for the success of which we are indebted to the care and skill of M. *Henry*.

In consequence of recent discoveries, we have been enabled to bring into notice substances which had long been neglected, and to distinguish others which, though very different, had been confounded together, and to offer them anew to the investigation of the medical profession. We have extended this care principally to the extracts of opium, prepared by different methods, and to certain varieties of oxides and metallic salts, especially to those of iron, mercury, antimony, and zinc, so important from their use in medicine, and so different in their effects, according to the different states in which they are employed. To their vulgar denominations we have added, in the titles under which they are placed, those which characterise their true nature; and in all instances in which there is no longer uncertainty in this respect, we have annexed the names adopted in the new nomenclature.

What we now offer to the physicians are the instruments of their art; but let it not be thought that in these is to be found the art itself. They would be strangely mistaken in

the object of medicine, who should believe that its chief end is the search of new remedies, or the invention of new formulæ; and who should think that true progress can be made in the art only by submitting all the substances in nature to the test of experiment. Undoubtedly we are acquainted with men—though their number is very small—indefatigable in their investigations of nature, enterprising with prudence, more attached to truth than greedy of renown, who in the difficult and perilous career of experiment, incapable of disguising their errors, know how to weigh scrupulously in a just balance, the fortunate and unfortunate results of their experiments; and who, by this wise plan, have succeeded in adding true riches to our materia medica, and have learned to call successfully to the succour of life even the poisons which seemed to have been produced for its destruction. But on the other hand, has not our age too often been witness of the delirium which seems to possess the minds of some practitioners, who think themselves idle by the sick bed when they have not agitated the frame by the violent shock of those medicines which they call energetic; who are deaf to the voice and the directions of nature; boasting of their guilty trials of a hazardous medicine as of something wonderful; straying far from the track of *Hippocrates, Aretæus, Celsus, Fernel, Boillou, Sydenham, Stahl, Torti, Baglivi, Boerhaave, Hoffman, Huxham, Pringle, Swieten, Stoll, Bordeu, Lorry, Barthez*, and others who have attained to greatness by their talents and knowledge.

For our own part, let us remember that the science which we cultivate is founded much less on the multitude of medicines, than upon a method springing from the study and observation of nature; let us not forget that the new paths which experience may open to us will be sure and practicable only so long as we strive to understand perfectly, and to take for our guides, the laws of the animal organization, of which the characteristic phenomena are always kept in sight by the wise man; and that the presumptuous vanity of inexperienced youth, or the most shameful ignorance could alone venture to infringe, or affect to despise them.

Miscellany.

Evaporation by Means of Bladders.

M. Sœmmering, in a memoir in the Academy of Sciences of Munich, states that alcohol, in a vessel covered with a bladder, the latter not being in contact with the fluid, loses, when exposed to a dry atmosphere, much of its water, and becomes stronger. But if the vessel thus closed be exposed to a damp air, the alcohol attracts humidity and becomes weaker.

In a second memoir, the author states more particularly the effect of bringing the alcohol into immediate contact with the membrane. If a bladder be filled with 16 ounces of alcohol at 75°, and be well closed, and suspended over a sand bath, or placed near a warm stove, so as to remain at the distance of more than an inch from the hot surface, it becomes, in a few days, reduced to a fourth of its volume, and is nearly, or quite, anhydrous.

M. Sœmmering prepares for this purpose, calves' or beeves' bladders, by steeping them first in water, washing, inflating, and cleansing them from grease and other extraneous matters, tying the ureters carefully, and then returning them to the water in order to clear off more fully the interior mucosity. After having inflated and dried the bladders, M. S. covers them with a solution of ichthyocolla, one coating internally and two externally. The bladders thus become firmer, and the alcoholic concentration succeeds better.

It is better not to fill the bladder entirely, but to leave a small space empty. The bladder is not moist to the touch, and gives out no odour of alcohol. If the latter be below 16° Baumé the bladder then softens a little, and appears moist to the touch.

Bladders prepared as above may be employed more than a hundred times, though they at length acquire a yellowish-brown colour, and become a little wrinkled and leathery. The swimming bladder of the salmon is not fit for these experiments. Alcohol of 72° was put into one of them, and after an exposure of thirty-two hours, it had lost more than one-third of its volume, and was weakened 12°. The alcoholic vapour was perceived by the smell.

Into two bladders of equal size were put, into one, eight ounces of water, and into the other, eight ounces of alcohol. They were placed side by side, exposed to a slight heat. In four days the water had entirely disappeared, while the alcohol had scarcely lost an ounce of its weight. Mineral water, and that of wells, evaporate and deposit on the interior of bladders, the saline matters which they contain.

If the heat be conveniently managed, absolute alcohol may be obtained in six to twelve hours. Solar heat is even sufficient to produce anhydrous alcohol.

Wine placed in prepared bladders contracts no bad odour; it assumes a deeper colour, acquires more aroma, and a milder taste, and becomes, generally, stronger. Spirits of turpentine of 75°, contained in a cylindrical glass closed with a bladder, lost nothing in four years. Concentrated vinegar lost the half of its volume in four months, the other half acquired more consistency, and had no longer an acid taste. The water of orange flowers was about one-third evaporated in a few months, appeared to have a stronger odour, and, consequently, had lost nothing of its volatile principle.—*Ferussac's Bulletin, Mai* 1828.

Wollaston's method of rendering Platina malleable.

A paper was read on a method of rendering platina malleable, by Wm Hyde Wollaston, M.D. F.R.S. &c. In this paper the author details the processes which, from long experience in the treatment of platina, he regards the most effectual in rendering that metal perfectly malleable. When it is purified by solution in aqua regia, and precipitation with sal ammoniac, sufficient care is seldom taken to avoid dissolving the iridium contained in the ore by due dilution of the solvent. The writer states the degree of dilution requisite for this purpose, and exact proportions in which the acids are to be used. The digestion should be continued for three or four days, with a heat which ought gradually to be raised; and the fine pulverulent ore of iridium allowed to subside completely before the sal ammoniac is added. The yellow precipitate thus obtained, after being well washed and pressed, must be heated with the utmost caution, so as to expel the sal ammoniac, but at the same time produce as little cohesion as possible among the particles of platina. It is then to be reduced to powder, first by rubbing between the hands, and next by grinding the coarser parts in a wooden mortar with a wooden pestle, because the friction with any harder surface would, by producing burnished surfaces, render them incapable of being welded together by heat. The whole is then to be well washed in clean water. In this process the mechanical diffusion through water is made to answer the same purposes as liquefaction by heat in the case of other metals; the earthy impurities being carried to the surface by their superior lightness, and the effect of fluxes being accomplished by the solvent powers of water.

The gray precipitate of platina, being thus obtained in the form of uniform mud or pulp, is now ready for casting, which is effected by compression in a mould, formed of a brass barrel, six inches and a half long, and turned rather

taper within, so as to facilitate the extraction of the ingot when formed. The platina is first subjected to partial compression by the hand with a wooden plug, so as to expel the greater part of the water. It is then placed horizontally in an iron press, constructed so as to give great mechanical advantage to the power applied to produce compression. The cake of platina is then to be heated to redness by a charcoal fire, in order to drive off all the remaining moisture; afterwards subjected to the most intense heat of a wind furnace; and lastly, struck, with certain precautions, while hot, with a heavy hammer, so as effectually to close the metal. The ingot thus obtained may, like that of any other metal, be reduced, by the process of heating and forging, to any form that may be required. It may then be flattened into leaf, drawn into wire, or submitted to any of the processes of which the most ductile metals are capable.

The perfection of the above method of giving complete malleability to platina is proved by comparing the specific gravity of a fine wire of that metal obtained by this process, which is found to be 21.5, with that of a similar wire drawn from a button, which had been completely fused by the late Dr Clarke with an oxy-hydrogen blowpipe, and which the author ascertained was only 21.16. A further proof of the excellence of the method employed by the author is derived from the great tenacity of the platina thus obtained as determined by a comparison of the weight required to break wires made of this metal so prepared, and similar wire of gold and of iron.

These weights he found to be in proportion of the numbers 590, 500, and 600, respectively.—*Annals of Philosophy.*

Comparative activity of tartarized antimony, as prepared by different formulæ.—M. Henry, Sen. has ascertained experimentally the several quantities of sulphuret of antimony precipitated by sulphuretted hydrogen, from a given weight of various specimens of unpurified tartar emetic,

and compared these amounts with the quantity precipitated from a very pure tartar emetic, as a standard.

Two parts of the standard preparation gave

of sulphuret of antimony - - - -	1.04 parts

While the same quantity of tartar emetic, according to the

London Pharmacopœia, gave	0.98
Dublin do	1.00
Edinburgh do	0.99
Paris Codex (with glass of antimony) - - -	0.68
Mr Philips's Formula, -	0.74

All these preparations, however, when well purified, contain the same quantity of protoxide of antimony.—*North American Medical and Surgical Journal, from the Journal de Pharmacie, July* 1825.

Henry's magnesia —M. Robiquet has remarked that this magnesia, though soft to the touch, and in very fine powder though compact, is less soluble in acids than the ordinary French calcined magnesia. This difference depends upon the strong calcination to which the former is subjected, whereby it is probably rendered less soluble in the juices of the stomach.—*North American Medical and Surgical Journal, from the Revue Medicale, January* 1827.

With respect to the calcination of magnesia, we believe some of the apothecaries of Philadelphia are in the practice of sending the article to the potters, to be exposed to the strong heat of their kilns. This may save trouble, but as the vessels in these ovens are placed in tiers, and each one is covered by the bottom of that which is above it, we doubt whether as much of the carbonic acid can escape as is desirable in this process. In Mr Durand's paper it is stated that *perfectly pure magnesia only* will cause the solidification of copaiba, and we know by experiment that all the magnesia usta of the shops will not accomplish this object. The inference is, that the magnesia was not originally deprived of all

its carbonic acid gas, or that it had re-absorbed it from the atmosphere; the latter event we have always been taught to believe took place very slowly.—*Ed.*

Acetate of Mercury.—Mr Garret states that there is a proto and per acetate of this metal, and attributes the occasional violent action of Keyser's pills to the presence of the latter salt. On the authority of M. Robiquet it is stated that a partner of Keyser was in the habit of preparing the acetate by dissolving red precipitate per se in acetic acid. The plan of the late M. Vallée, former professor of the school of pharmacy, was by double decomposition between the protonitrate of mercury and acetate of lime.—*N. Am. Med. and Surg. Journ. from the Archiv. Gen. de Med. July* 1826.

Cornus circinata.—Dr Robinson, in an essay on the properties of this bark, gives the following facts, derived from George W. Carpenter, respecting its composition and chemical habitudes. Diluted alcohol is the most appropriate menstruum to separate its active properties; the extract is dark red, and possesses all the astringency and bitterness of the bark in a concentrated degree. The alcoholic solution is rendered milky and precipitated by water; the extract from the ethereal tincture is a compound of resin, oil, and a peculiar saline matter, which compound appears to combine the most active portions of the article. Sulphate of iron changed its colour, and afforded a light precipitate: lime water occasioned a copious deposit; sulphuric, nitric, tartaric, acetic, and prussic acids did not alter the infusion. The most marked difference between the effects of reagents on the circinata and cinchona, is, that with the infusion of the former, neither galls or gelatine throw down any precipitate, while with the latter a deposit always follows. The constituents of this bark appear to be tannin, gallic acid, resin, gum, mucilage, oil, and a peculiar saline matter, which is less bitter and more astringent than the salt discovered in the cornus florida.—*North American Medical and Surgical Journal, July,* 1828.

Action between nitrate of silver and linseed.—Apothecaries in France are in the habit of keeping the fused nitrate of silver in linseed. It is stated by M. Dulong that a mutual action takes place between these substances, and that although when dry this is slow, yet an appreciable quantity of the fused nitrate is absorbed by the seeds, leaving minute excavations on the surface of the nitrate. Other seeds have the same effect, and M. Robiquet stated that death had followed the use of linseed in which this caustic had been preserved. We do not know that this practice prevails any where in this country, but the fact is worthy of note. M. Dulong states that it is very important to avoid the use, in pharmaceutical operations, of vessels fabricated of more than one metal. *Communicated to the section of pharmacy of the French Academy, by M. Henry.—N. Am. Med. and Surg. Journal.*

Mode of distinguishing arrow-root from wheat or potato starch.—M. Virey states that ten grains of wheat or potato starch will form a pretty thick jelly with two ounces of boiling water, while the same quantity of arrow-root forms a thin liquid. The mode of distinguishing one substance from another is always valuable knowledge, and as a considerable quantity of potato starch has lately been introduced to our market, and at first palmed upon our apothecaries for Bermuda arrow-root, the above test may not be unworthy of remembrance.

Residuum of nitre, after exposure to a red heat.—In the beginning of May 1827, Mr, now Dr, Robert Bridges, observed when water was poured into an iron flask used for obtaining oxygen from nitre, that a lively effervescence occurred, and the gas evolved, proved, on examination with Dr Hare's eudiometer, to be oxygen of the purity of ninety-five per cent. Subsequently he obtained this element by the same means, containing only one per cent. of impurity. The same observation was made by R. Philips, of London, in 1827. The rationale offered by Dr Hare of this discovery

is, that the residuum of the nitre in the flask was a peroxide of potassium, which, by the affusion of water, gave off its second dose of oxygen, and became converted into hydrate of potassa. Mr Philips offers the same solution of the fact.

Dr Bridges suggested that peroxide of potassium obtained in this manner from nitre, would form a good preparation from which to obtain pure oxygen, without the least trouble to the experimenter.—*N. Am. Med. and Surg. Journal.*

Preparation of per-iodide of mercury.—Add a solution of hydriodate of potassa to a solution of per-nitrate of mercury. By double decomposition there will be formed nitrate of potassa, water, and a red precipitate, which is the iodide in question. It is applied in alcoholic or ethereal solution, mixed with lard, or suspended in oil.—*N. Am. Med. and Surg. Journal, from the Nouvelle Bibliothèque Medicale, December* 1826.

Pure strychnia not reddened by nitric acid.—In the Journal Général de Medecine, for August 1828, M. Caventou has inserted a note in correction of a mistake, contained in the memoir of MM. Orfila and Le Sueur, on the detection of poisons in bodies a long time after death. The latter gentlemen stated in their memoir that they verified the presence of acetate of strychnia by a red colour developed by nitric acid.

This alkali was discovered in 1818 by MM. Pelletier and Caventou. They stated that it was reddened by nitric acid; at the same time they found that strychnia procured from nux vomica presented this character in greater degree than when extracted from the bean of St Ignatius. They suspected the cause of this difference to depend on a greater or less quantity of brucia being present; and subsequently verified this suspicion by chemical researches on the *upas anthiar* and *tieuté*, the celebrated poisons of Java. The result is that pure strychnia is not reddened by nitric acid, and that this colour only follows the addition of the

acid when brucia is combined; which is the case in the nux vomica and the bean, or a yellow colouring matter found only in the upas tieuté.—*N Am. Med. and Surg. Journal, Jan.* 1829.

Fermentation of opium as applied to the extraction of morphia.—On the 26th of July last, M. Blondeau read a note to the section of pharmacy of the French Academy of Medicine, on the application of fermentation to the separation of morphia from opium. It results from his experiments that when fermentation has decomposed the other elements of the drug, nearly the whole of the morphia may be obtained. By pursuing this plan Mr B. has procured from the French pound of opium as many as fourteen "gros," equal to 827.4 grs. troy. This is a very extraordinary product, and we hope some of our pharmaceutists will be disposed to attempt the repetition of the process.—*N. Am. Med. and Surg. Journal.*

Artificial production of Diamonds by M. Gannal.—Introduce several sticks of phosphorus into a small matrass containing the bisulphuret of carbon, covered with a layer of water. The phosphorus will melt and sink to the bottom of the matrass. Mix the ingredients together, and by their reaction, phosphuret of sulphur will be formed, and a white powder generated, which reflects the prismatic colours, and which appears to consist of a multitude of minute crystals. Upon repeating the experiments and giving more time for the crystals to form, a few were obtained of the size of a millet seed. These were submitted to M. Champigny a jeweller, who examined them carefully, and satisfied himself, 1st, that they scratched steel; 2d, that they were of a pure water; and 3d, that they caused a most brilliant reflection of light. In a word, he pronounces them to be true diamond sparks.—*Journal de Chimie Med.*

Coniin or the active principle of cicuta.—M. Brande

gives the following process for obtaining this principle:—Digest the leaves and stem of the fresh plant, well bruised, for several days, in alcohol. Filter the solution and evaporate to dryness. Treat the alcoholic extract with water, and add to the aqueous solution obtained either magnesia, alumina, or the oxide of lead. Evaporate this solution to dryness, and treat the dry residue with a mixture of alcohol and ether. This menstruum takes up the coniin, which, by a new evaporation to dryness, is left in a pure state.

This principle, according to M. Gieske, possesses the following properties. 1st, In contact with tincture of iodine its solution gives rise to a reddish precipitate. 2d, The tincture of galls renders its solution brown, but causes no precipitate. 3d, It precipitates solutions of sulphate of mercury and muriate of zinc of a dirty yellow colour. 4th, It occasions a slight turbidness in solutions of the carbonates of potassa and soda. 5th, It communicates a brown colour to the muriate of platinum. 6th, With the nitrates of silver and baryta, the acetates of baryta and lead, the muriate of lime or lime water, it gives rise to grayish white precipitates.

Half a grain of coniin is sufficient to kill a rabbit.

The symptoms induced by it are analogous to those produced by strychnia.—*N. Am. Med. and Surg, Journ. from Archiv. General. June* 1828.

A. T. Thomson in his Dispensatory, 4th edition, says, "The virtues of conium are extracted by alcohol and sulphuric ether. To the ether it communicates a very deep green colour; and when the tincture is evaporated on the surface of water, a rich dark green resin remains, in which the narcotic principle of the plant appears to reside. It contains the odour and taste in perfection; and half a grain produces headach and slight vertigo. To this principle, which *I discovered*, Dr Paris proposes to give the name of *conein*."

Preparation of hydriodic acid.—Dissolve sixty grains of

iodine in a sufficient quantity of alcohol; diffuse one ounce of finely divided starch through four ounces of water, and add this, drop by drop, to the former solution; allow the iodide of starch to settle, and pour off the clear liquid. Pass a current of sulphuretted hydrogen through the deposit, the colour will at first change to orange yellow from the formation of an iodide of sulphur, then it will become yellow, and ultimately white. The whole is to be filtered, the insoluble part washed with small quantities of water, and the solution slightly heated to dissipate the sulphuretted hydrogen. The solution may be obtained of specific gravity 1.5, and is pure hydriodic acid.—*Brande's Archives, XXII.* 45.

State of pharmacy in France.—The great attention which is paid to the instruction of pupils in the science of pharmacy in France, may be learned from the following account of an examination of candidates for the places of pupils of pharmacy to the hospitals of Paris, condensed from the Journal de Chemie Medicale for July 1828.

Count Chaptal presided at the examination, assisted by Drs Jadiaux and Lallemant, M. Henry, chief of the central pharmacy, and MM. Duval, Harveng and Petroz, chief pharmaceutists to the hospitals. The exercises consisted of three kinds: 1. Questions to which written answers were required; 2. Questions to be answered verbally; and, 3. Manipulations which were performed before the board of examiners. The questions to be answered in writing, were, 1. What is gum arabic? Describe the kinds in commerce, and state their origin. 2. State the preparation of citrine ointment, its characters, and the alterations which it is liable to undergo by time, &c. 3. What is the chemical composition of opium? Give the methods of extracting morphia and narcotine. The verbal questions related to the different kinds of distillation; the nature of syrups, and their mode of preparation; the menstrua for separating the soluble parts of plants; the nature of conserves, and the general rules for

their preparation; the distinctions between cerates, pomatums, and ointments, and the general rules for their preparation. The manipulations required to be performed were, 1. To make an emulsion with turpentine; 2. To prepare whey.

The examinations having terminated, the written answers of the candidates were considered at *seven* meetings. The relative merits of the pupils were discussed by the aid of the notes taken by the examiners, and each was classed according to his proficiency.

Finally, the board of examiners, at a public sitting, announced the names of those candidates who were deemed worthy of being recommended as resident pupils, and of those also who were to be considered as provisional pupils, to fill vacancies until the next examination. A course of examinations of this kind, in which not merely the absolute, but the relative acquirements of the candidates are ascertained, must be viewed as well calculated to call forth the greatest exertions on the part of the pupils, on the principle of rivalship.—*N. Am. Med. and Surg. Journ. October* 1828.

State of pharmacy in Philadelphia.—The difficulties which surrounded the Philadelphia College of Pharmacy in its infancy, are gradually yielding to the enlightened and steady perseverance of its officers and members; a healthy and vigorous action is sensibly and rapidly diffusing itself through the body: and we anticipate abundant fruits that will reflect credit upon the institution, and materially influence the prosperity of American pharmacy.

The diplomas, it is authorized to grant, are becoming an object of deep interest to the pupils, and exciting a corresponding degree of emulation, ambition and research. Every year the number that steps forward to claim the degree of the college increases; and at an examination held on the afternoons of the 15th and 16th of April, seven candidates presented their theses for graduation, and were examined by the professors and committee appointed to be present on the occasion.

The several examinations consisted of desultory questions on the elements of chemistry, materia medica, and pharmacy. The theses were mostly respectable productions, and some of them deserve great praise for the research and talent which they indicate, as well as for the clearness and correctness of the composition, and the general neatness of execution. Though conducted with less formality, and surrounded by fewer imposing circumstances than the French examinations, yet the questions proposed to our pupils were not less difficult or various, and could not have been answered with so much ease and promptness as they were, without a familiarity, acquired by close study, with the elementary works of the several branches. The proficiency of the pupils was so satisfactory to the committee and professors, that they agreed, and informed the candidates that they would make a favourable report of their individual examinations to the board of trustees. This body will order the diplomas to be struck off, and signed by the professors of chemistry and materia medica, the president, vice presidents, and secretary of the college.

A commencement will be held, at which the degree will be conferred upon the graduates, but the diplomas will be deposited with the president, and delivered to the young gentlemen as they successively arrive at the age of twenty-one years.

The following is a list of the graduates, with the subjects of their theses:

Charles Pleasants. On opium.

William R. Fisher. On the Preparations of Iodine.

Joseph Head Brooks. On Opium and the Dregs of Laudanum.

Joseph Scattergood. Analysis of Oak Barks.

John Allen. Analysis of the Wild Cherry Tree Bark.

Franklin R. Smith. On the Bicarbonate of Soda.

Robeson Moore. On the Hepatica Triloba.